Special 17-Page Report: Mac Clones and Power Mac Successor

# APRIL 1995 APRIL 1995

First Lab Tests

# GONGS

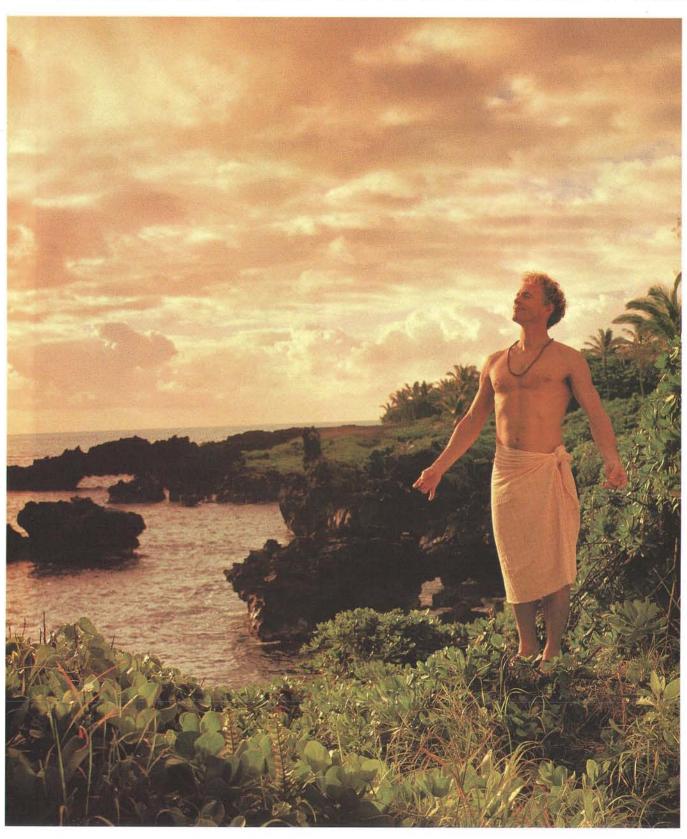
Extensive Analysis
Reveals Speed
and Mac Compatibility

Plus: 13 More Players Likely to Take the Mac Clone Plunge, Page 92 VideoVision Workstation

rad is



## MANY PEOPLE STRIVE FOR PEI WOULD YOU SETTLE FOR PERI



# FECT HARMONY IN THEIR LIVES. ECT HARMONY IN YOUR MAC?

Microsoft Office 4.2 Everything in your life may not always come together. But on your Macintosh,

it's another story. Because now there's a family of leading, full-featured programs for the Mac\* that truly work together like one.

Microsoft\* Office 4.2.

Think of Office as programs that look alike. Programs that act alike. Programs that work so closely together, you'll feel like you're using just one.

An example? Let's say you want to change a sales chart that's part of a report to your boss. Go ahead. Simply click on your chart and

The full flow have format bods table Biodone

(1) Format in the format bods table Biodone

(2) Format in the format bods table Biodone

(3) Format in the format bods table Biodone

(4) Format in the format bods table Biodone

(5) Format in the format bods table Biodone

(6) Format in the format bods table

(7) Format in the format bods table

(7) Format in the format bods table

(8) Format in the format bods table

(9) Format in the format bods table

It's never been this easy to move data between programs. All you do is drag and drop.

instantly your Microsoft Excel spreadsheet tools appear. Without ever leaving Microsoft Word.

Talk about being connected.

The fact is, the walls are down. You're now free to combine words, numbers and pictures with ease. Without leaving your document.

Better yet, no matter what you're working on, you're working smart. Thanks to

IntelliSense™ technology, :

One click turns your Word document into a PowerPoint presentation.



built-in intelligence that senses what you want to do, then helps you do it.

Behind Office, you'll find even more smarts: Microsoft's unlimited product support. It's available at no service charge.\* Just call.

But first, call (800) 709-3787,

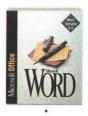
Department YP4, to locate a retailer near you. They'll help you learn all about Microsoft Office

Standard 4.2, in versions for both Macintosh and Power Macintosh."

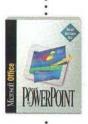
So give us a ring.

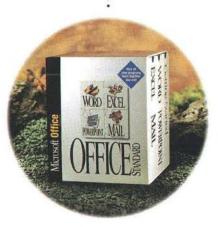
Then give your Macintosh something that most people spend a lifetime searching for.

Microsoft Office 4.2 for Macintosh and Power Macintosh includes new versions of Microsoft Excel, Word, PowerPoint" and a Mail workstation license.









Microsoft Office

<sup>\*</sup>Support for Microsoft Office is no-change; however, normal telephone company changes apply. Microsoft support services are subject to Microsoft's then-current prices, terms, and conditions, and are subject to change without notice. © 1994 Microsoft Corp. All rights reserved. Microsoft Office Standard edition, shown here, includes: Microsoft Excel, Word, PowerPoint presentation graphics program and a Mail workstation license (server and software must be acquired separately). For info only: in the 50 United States, call (800) 709-3787, Dept. YP4. In Canada, call (800) 563-9048. Outside the U.S. and Canada, call your local Microsoft subsidiary or (206) 936-8661. Customers can reach Microsoft text telephone (TT/TDD) services at (800) 892-5234 in the U.S. or (903) 568-9041 in Canada. Microsoft and PowerPoint are registered trademarks and Intellisense is a trademark of Apple Computer, Inc.

# OUR NEW PRINTER MAKES AND THOROUGHLY CONV (MUCH LIKE THE ONE WE'

At this very moment, it's our job to dazzle you, persuade you, and sell you on this great idea we have.

Of course, you already have that job, every day.

And that's exactly why you should consider the new NEC SuperScript™ Color 3000 printer for Windows™

THERMAL PRINT HEAD Color 3000M for
Macintosh®. If you
make overheads, if you

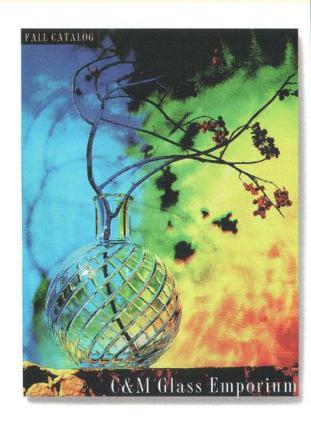
Thermal Transfer Process make slides, if you make graphic presentations, they simply make your work look clear, precise, and professional.

You see, the SuperScript Color 3000 is a thermal transfer printer. And, when it comes to color, it is far superior to an ink-jet printer. Ink-jet printers can leave you with washed-out colors. Not so with thermal transfer.

What's more, this NEC printer allows you to choose between three different modes of printing. That's because, as you know, color printing can get expensive, and there are times

when you need a color print but not a deluxe photographic-quality print. The SuperScript Color 3000, unlike most printers out there, gives you a choice.

Photo Color™mode gives you the ability

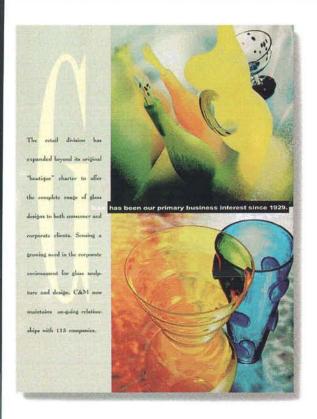


#### PHOTO COLOR MODE

to print incredibly sharp, vivid photographic-like color images. In short, professional-looking images that will add polish to any presentation.

With our Graphic Color™mode, the size of the dots on the page are controlled to give you nearphotographic quality, but at less cost per page than the Photo Color mode. Finally, the Thermal Transfer mode is ideal for charts, graphs and

# A COLORFUL, DRAMATIC INCING PRESENTATION. RE ABOUT TO GIVE YOU.)



#### C&M Glass Emporium GROWTH OF OUR RETAIL DIVISION The decorative glass industry has encountered number of franchised retailers has grown to 37. In a year when we expected to add 6 additional branches, changes over the past decade. Just 10 years ever-present cylindrical and tubular design we have added 11 additional operation were virtually non-existent. Nou, The retail division has expanded beyond its with the advent of several advanced original "boutique" charter to offer the es, countless design splete range of glass designs to both here and abread, are findboth consu mer and corn int new ways to raise the level clients. Sensing a growing need of expression in glass sculpin the corporate envir ture and glass design. for these sculpture and design. C&M new maintains on-going At C&M Glass Emporium, we rate on more than just glass We also concentrate on light. After all, light is states. In lobbies, confe what brings glass its beauty, its shine, its reflection. suites you'll often find an original \_ And what often C&M design. Plus, we're currently estehes your eye developing new ways to expand the back constrainting of eathers your eye the element of glass and high the first is not the formed CAMA to person the high-and of the line into the often overlooked place anatoms and design And an accelepture itself, but the way light hits it. corporate gift-giving area. We expect very rapid growth and reacts with it. This basic understanding of the elements of glass and light has allowed C&M to pursue the high-end of glass sculpture and design. And we believe this approach is working. During the past year, we've seen as sales increase 24%. Net profits are at an all-time high. And the total

#### GRAPHIC COLOR MODE

diagrams. And you can use it to make rough color drafts, which will certainly save money over the long haul.

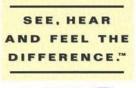
On the subject of saving money, the NEC SuperScript Color 3000 will cost you less than \$1,000. For a color printer with three different printing modes, that price, quite simply, is just hard to beat. (We invite you to compare.)

Well, that concludes our presentation. Now it's

#### THERMAL TRANSFER MODE

time to close the sale. For additional information regarding SuperScript color printers, simply call 1-800-NEC-INFO. Or have information sent to

you, via fax, by calling NEC FastFacts™ at 1-800-366-0476. Request document #7723000 for Windows or #7723006 for Macintosh.





# MACWORLD THE MACINTOSH® AUT

AUTHORITY APRIL 1995

#### **Features**

#### 92 First Clones



BY CHARLES PILLER The first non-Apple Macs are here! Macworld Lab tests the first clones to see if they meet Apple's high standards.

#### 102 Mac Hybrids

BY CHARLES PILLER Apple and IBM are working on a computer that can run the Mac OS—plus Windows, OS/2, and Unix. Here's a first look at the Mac of the future.

#### 110 Meeting the E-Mail Challenge

BY JOEL SNYDER E-mail networks don't have to be a hassle. Macworld explains the tools and techniques for organizing and building large, integrated office networks.

#### 116 The RAID Option



BY MATTHEW LEEDS Need high-performance, high-demand storage? Macworld Lab tests 17 RAID systems to ferret out the best buys for a range of storage needs.

#### 126 The Paper Chase



BY GALEN GRUMAN Will portable-document technology bring users any closer to the fabled paperless office? *Macworld* examines five programs to determine which deliver on their promise.

ON THE COVER

Photo by Paul Franz-Moore



What Apple and IBM's partnership means for the future of Macintosh, page 102.

#### Opinion

19 State of the Mac

BY ADRIAN MELLO Apple opens up the field to clones.

- 25 Letters
- 161 The Desktop Critic

BY DAVID POGUE Multimedia in the shareware limelight.

163 The Iconoclast

BY STEVEN LEVY Momma, don't let your babies grow up to be PDAs.

167 Conspicuous Consumer

BY DEBORAH BRANSCUM The hits and near misses of buying a Macintosh.

248 Wise Guy

BY GUY KAWASAKI Worthy aspirations for Gates the Great.

#### News

- 33 MacBulletin
- 34 News Apple's plans for Copland • Apple's game machine • More digital video on the way, and more
- 41 Power Mac News Apple's move to an all-native OS Power Watch: Virex 5.5, MathType 3.1, and more
- 43 Macworld Online An Internet update Shareware picks, and more
- 45 New Products





#### Graphics

- News Illustrator plug-ins Draw programs of a different color · Photo-realistic color under \$5000, and more
- **Expert Graphics** 136 BY CATHY ABES Graphics professionals share their secrets.

#### At Work

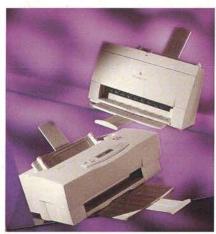
- 140 News Quicken for the office • Mapping, risk-analysis add-ins for Excel • ScanCard on the Mac, and more
- 143 **Working Smart** BY JIM HEID Speed up your Macintosh.
- 149 **Quick Tips** BY LON POOLE Tips, tricks, and shortcuts.



Macworld Lab puts RAID-the ultimate in speed and storageto the test, page 116.

#### Networks

- 152 News ISDN heats up • Fast Ethernet via PCI · Apple Talk network encryption, and more
- 155 **PowerBook Notes** BY CARY LU What to do when something goes wrong.



It's the Apple Color StyleWriter 2400 versus the Phaser 140 in Reviews, page 63.

#### **Buvers' Tools**

- 169 **Editors' Choice** Top picks from our comparative articles.
- **Star Ratings** 171 Hardware and software reviews at a glance.
- 179 Streetwise Shopper Hardware and software bargains: discounts, bundles, upgrades.

#### **How to Contact Macworld**



Agril 1999, Volume 12, Number 4 Macworld (ISSN 0741-8647) is published monthly by Macworld Communications, Inc. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/43-0505. Subscription orders and inquiries should be directed to 800/288-6648 or 303/604-1865. Subscription rates are \$30 for 12 issues, \$60 for 24 issues, and \$30 for 36 issues. Foreign orders must be prepaid in U.S. funds with additional postage. Add \$19 per year for postage for Canada and Mexico subscribers. Add \$59 per year for postage for Canada and Mexico subscribers and \$59 per year for postage for Canada and Mexico subscribers and \$50 for year for postage for Canada and Mexico subscribers and \$50 for year for postage for Canada and Mexico subscribers. Add \$59 per year for postage for Ganada and Mexico subscribers at \$50 for year for postage for Canada and Mexico subscribers. Add \$59 per year for postage for Ganada and Mexico subscribers and \$50 for year for postage for Single Singl

#### Reviews

- 56 Painter 3 Paint program
- 58 EAB401P Speakers; EAB701P Speakers Multimedia speakers
- Virtus WalkThrough Pro 2.0 Design tool
- Now Contact 3.0; Now Up-to-Date 3.0 Personal information managers
- Apple Color StyleWriter 2400; Phaser 140 Ink-iet color printers
- PhotoEnhancer 1.0 Digital-photo enhancement utility
- 67 ArtPad Pressure-sensitive tablet
- MultiClip Pro 3.1 Clipboard utility
- 69 FullWrite 2.01 Word processor
- 71 Adobe Dimensions 3-D-effects software
- 71 HoloGate 1.0 Electronic-mail gateway
- Expresso 1.0 Calendar and address book
- Overture 1.02 Music-notation software
- 75 Inspiration 4.1 Writing tool
- **EndNote Plus 2.0** Bibliography and citation manager
- Read-It O.C.R. Pro 5.0 Optical character recognition software
- Special Delivery Multimedia authoring tool
- mPower 2.0 Multimedia authoring program
- RescueTxt 1.0 Text utility
- 83 MLab Mathematical-modeling software
- NetWorks 3.0.4 Network-monitoring utility
- 85 RemotePoint Cordless pointing device
- 87 MMS557 Multimedia speaker system
- PaperPower 1.0 Graphics tablet utility
- Widget Workshop Wacky science simulation
- CyberBoogie Children's animation software





microLaser™ 600 Printer Under \$900.

Laser-quality printer for the business professional looking for "personal" 600 dpi Adobe" PostScript" printing. 5 pages per minute, 2 MB memory with Adobe Memory Booster". Mac"/Windows"/DOS compatible.



microLaser Pro 600 Printer Under \$1,300.

The easy solution for users looking for a *feature packed*, high performance 600 dpi printer. It comes standard with a printing speed of 8 pages per minute, 3 MB memory with Adobe Memory Booster. Mac/Windows/DOS compatible. Adobe PostScript 2/PCL 5" emulations.



microLaser Pro E Printer Under \$1,450.

Ideal for *volume intensive small work groups*.

12 pages per minute, 600 dpi, 3 MB memory with Adobe Memory Booster. Mac/Windows/DOS compatible.

Optional multi-network interface now available.







MacUser \*\*\*\*







Now available

for microLasers:

Optional
multi-network
interface
with
EtherTulk.



microLaser Pro 600 is winner of these fine awards.

All prices are estimated street prices. Dealer prices may vary, microLaser and "Extending Your Reach" are trademarks of Texas Instruments Incorporated, OS/2 is a registered trademark of IBM, Corp. Mac is a registered trademark of Apple Computer, Inc. Adobe Memory Booster is a trademark and Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. Windows is a registered trademark of Microsoft Corporation. PCL is a trademark of Hewlett-Packard, Inc. © 1995 TI.



#### But our printers do.

You won't get thrown by a TI printer. You'll find 20 years of experience designed into a line of printers that redefines easy. A family of friendly printers that extend your reach — without extending your budget.

**Easy to use.** As you have come to expect with a Mac, our printers are designed to be *plug and run*. Just open the box<sup>†</sup>, load the software, pop in the consumables and you're ready.

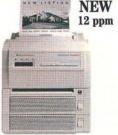
Easy to maintain. You'll find our printers virtually trouble-free. From printheads to toner cartridges to imaging units, our long-life consumables can be dropped into place in seconds — and they're economical enough to give you a very low cost per

page. We have even eliminated the need for special tools to upgrade your printer. To add more memory to our microLaser printers, simply remove two thumbscrews, pop in the board and you're done.

Easy to service. We've built our printers to be trouble-free, complete with a one-year limited warranty and a toll-free technical support line. So if you do have a question, you get live, friendly assistance from professionally trained technicians.

Easy to own. Our printers have the friendliest prices around. And we're so sure you'll like them, we offer a 30-day risk-free trial\*\* to make sure you're perfectly satisfied.

Easy to buy. Just call 1-800-TI-TEXAS (1-800-848-3927). Ask us anything you want. We'll send you literature and competitive comparisons within 24 hours with all the details you'll need to find the TI printer that's just right for you.



microLaser PowerPro Printer Under \$1,750.

Easily one of the fastest 600 dpi printers for the price, and *ideal for heavy graphics printing.* 12 pages per minute, 6 MB memory, a turbo charged processor, and 67 scalable fonts. Mac/Windows/DOS compatible.



microLaser PowerPro is winner of this fine award.

†Cable not included. ††Offer applies to all new microLaser printers if returned in good condition.

EXTENDING YOUR REACH





LineMagic" software is something else you can't find anywhere but here. It's designed for anybody who shares a phone line with a fax modem. What

money.

Instead of buying another serial peripheral or an expensive LocalTalk converter box for your workgroup, you can leverage what you already have. All it takes is PortMagic."

Check out MediaMagic

software. And save serious

PortMagic allows workgroups of 1-10 people to share a peripheral previously dedicated to one computer. So now everybody has equal access to the modem, label printer, serial ImageWriter, you name it. Right from their desk.

Better yet, *PortMagic* is only \*149. Just try to find ten peripherals at that price. You can't.

LineMagic\* software is something else you can't find anywhere but here. It's designed for anybody who shares a phone line with a fax modern. What LineMagic does is distinguish the type of incoming call: data, fax, ARA, or voice. The software works transparently, handling the call accordingly—even routing voice calls to voice mail applications.

You wind up saving big.
The time it used to take you to handle data, fax, or voice calls.
And the price of more expensive hardware solutions. At only \*79, LineMagic's a no-brainer.

Lastly, our \$89 ScanMagic\*\* enables you to share an Apple SCSI scanner throughout your network. Like all our other software, this, too, works like magic.

\$89

Stretch your dollars and your existing resources, Call us at: 1-800-SAY-MAGIC. Each product meets the highest standards and carries a 15-day money back guarantee. Major credit cards accepted.

Order today instead of buying new equipment. And see how a little magic goes a long way.



Call us: 800-SAY-MAGIC

@MediaMagic Solutions, Inc. 20245 Stevens Creek Blvd., Suite 201, Cuperino, CA 95014, Fax 8: 1-408-777-7963.
For international orders call: 1-408-777-7676. All trademarks are property of their respective holders.
\*Available options vary with modem. Please call for details for your modem.

# Macworld

CHIEF OPERATING OFFICER
MACWORLD MAGAZINE
EXECUTIVE ASSISTANT
DIRECTOR OF FINANCE
DIRECTOR OF HUMAN RESOURCES
HUMAN RESOURCE REPRESENTATIVE
DIRECTOR OF CORPORATE INFORMATION SYSTEMS
INFORMATION SYSTEMS MANAGER
CORPORATE BUSINESS MANAGER

ACCOUNTING/OPERATIONS MANAGER

ACCOUNTING/FACILITIES MANAGER

SENIOR FINANCIAL ANALYST

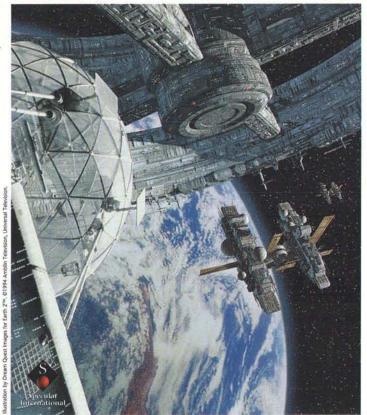
Sharon Sanderson
Stephen Daniels
Shelly Ginenthal
Marisa Chow
EMS
Walter J. Clegg
Rick Valdez
Christina W. Spence
Pat Murphy
Michelle Reyes
Madeleine Buckingham

Colin Crawford

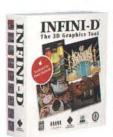
MACWORLD is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 220 computer publications in 64 countries. Forty million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S Computerworld Argentina, Infoworld Argentina; ASIA'S Computerworld Hong Kong, PC World Hong Kong, Computerworld Southeast Asia, PC World Singapore, Computerworld Malaysia, PC World Malaysia; AUSTRALIA'S Computerworld Australia, Australian PC World, Australian Macworld, IDG Sources, Reseller, Network World, Mobile Business Australia; AUSTRIA'S Computerwelt Oesterreich, PC Test; BELGIUM'S Data News (CW); BRAZIL'S Computerworld, Game Power, Super Game, Gamepro, Mundo IBM, Mundo Unix, PC World; BULGARIA'S Computerworld Bulgaria, Ediworld, PC & Mac World Bulgaria, Network World Bulgaria; CANADA'S Direct Access, Graduate Computerworld, InfoCanada, Network World Canada; CHILE'S Computerworld, Informatica: COLOMBIA'S Computerworld Colombia; CZECH REPUBLIC'S Computerworld, Elektronika, PC World; DENMARK'S CAD/CAM WORLD, Communications World, Computer rorld Danmark, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Windows World: ECUADOR'S PC World: EGYPT'S Computerworld Middle East. PC World Middle East; FINLAND'S MikroPC, Tietoviikko, Tietoverkko; FRANCE'S Distributique, Golden Mac, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux; GERMANY'S Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unit; GREECE'S Infoworld, PC Games; HUNGARY'S Alaplap, Computerworld SZT, PC World, PC Virlag, INDIA'S Computers & Communications, IRELAND'S Computerscope (Computerworld); ISRAEL'S Computerworld Israel, PC World Israel; ITALY'S Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC World Italia: JAPAN'S Information Systems World, Computerworld Today, Nikkei Personal Computing (PCW), Macworld Japan, SunWorld Japan, Windows World; KENYA'S East African Computer News; KOREA'S Computerworld Korea, Macworld Korea, PC World Korea; MEXICO'S Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; THE NETHERLANDS' Computable (CW), Computer! Totaal, LAN Magazine, MacWorld; NEW ZEALAND'S Com puter Listings, Computerworld New Zealand, New Zealand PC World; NIGERIA'S PC World Africa; NORWAY'S Computerworld Norge. C/world, Lotusworld Norge, Macworld Norge, Networld, PC World Ekspress, PC World Norge, PC World's Product Guide, Publish World, Student Data, Unix World, Windowsworld, IDG Direct Response; PANA-MA'S PC World Panama; PERU'S Computerworld Peru, PC World; PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, China Infoworld, China Network World, PC World China, IDG Shenzhen's Computer News Digest, Electronics International, IDG HIGH TECH Beijing's New Product World; PHILIPPINES' Computerworld, PC World; POLAND'S Computerworld Poland, PC World/Komputer, PORTUGAL'S Cerebro/PC World, Correio Informatico/Computerworld, MacIn; ROMANIA'S PC World, Computerworld; RUSSIA'S Computerworld-Moscow, Mir-PC, Sety; SLOVENIA'S Monitor Magazine; SOUTH AFRICA'S Computing S.A., Network World S.A., Computer Mail; SPAIN'S Amiga World, Computerworld Espana, Communicaciones World, Macworld Espana, NextWorld, PC World Espana, Publish, Sunworld, Super Juegos Magazine (GamePro); SWEDEN'S Attack, ComputerSweden, Corporate Computing, Lokala Natverk/LAN, Lotus World, MAC&PC, Macworld, Mikrodatorn, PC World, Publishing & Design (CAP), Datalngenjoren, Maxi Data, Windows World; SWITZERLAND'S Computerworld Schweiz, Macworld Schweiz; TAIWAN'S Computerworld Taiwan, Global Computer Express, PC World Taiwan; THAI-LAND'S Thai Computerworld; TURKEY'S Computerworld Monitor, Macworld Turkiye, PC World Turkiye; UKRAINE'S Computerworld; UNITED KINGDOM'S Computing/Computerworld, Connexion/Network World, Lotus Magazine, Macworld, Sunworld; UNITED STATES' ArnigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Desktop Video World, DOS Resource Guide, Electronic Entertainment Magazine, PlayRight, Power PC World, Federal Computer Week, Federal Integrator, GamePro, IDG Books, InfoWorld, InfoWorld Direct, Laser Event, Macworld, Multimedia World, Network World, NeXTWORLD, PC Letter, PC World, Publish, SunWorld, SWATPro, Video Event; VENEZUELA'S Computerworld Venezuela, MicroComputerworld Venezuela; VIETNAM'S PC World Vietnam.

Circle 103 on reader service card

## Get a whole new perspective.



This image from NBC's new television series Earth 2 was created with Infini-D, Specular's professional 3D modeling, rendering, and animation tool. Infini-D's ease-of-use puts the power of 3D illustration and animation into the hands of any designer. The models in this scene were instantly created from EPS outlines drawn in Adobe Illustrator™. A combination of image maps and bump maps were applied to the objects to enhance their realism. Since Infini-D is native for the Power Macintosh, rendering a high-quality animation was quick and easy. No matter which planet you're on, you will find that "Infini-D offers sophisticated controls and features that make it easy to create 3D scenes and animations... at a price that makes it difficult to resist." MacWEEK



#### Specular Infini-D 2.6

The 3D Graphics Tool for Print, Digital Video and Multimedia

Call 1-800-433-SPEC for info.

Code: AT009. Specular Infini-D™ and the Specular logo are trademarks of Specular International, Ltd. All other trademarks are the property of the respective owners. © 1994 Specular International. All rights reserved.

## Add some texture to your life.



Each texture in this image was created with TextureScape, Specular's versatile texturegeneration program that lets you design unique, high-resolution
textures. TextureScape's extensive design features allow you to control
virtually every attribute of a texture or pattern. Experiment with shape,
color, light, spacing, layering, motion, and more! TextureScape files
take up less than 40K of disk space, but since they are based on
PostScript shapes from programs like Adobe Illustrator™, you can
render them to any size you need. Your textures are even tileable!

TextureScape can also produce QuickTime movies of morphing textures for multimedia presentations or video. With the power to design anything from patterns like

TextureScape can also produce QuickTime movies of morphing textures for multimedia presentations or video. With the power to design anything from patterns like fabrics and tiles to organic textures like wood and marble, "...it's hard to beat TextureScape for an endless supply of cool textures." MacUser



## Specular TextureScape 1.5

The Texture Design Tool for Print, Digital Video and Multimedia

Call 1-800-433-SPEC for info.

Code: AT009. Specular TextureScape™ and the Specular logo are trademarks of Specular International, Ltd. All other trademarks



EAsycolor 24

BLAST TABLE FAST COLOR 24 duralises to a time time to me

"The EAsycolor 24 duplicates the functions of the Radius Thunder IV cards, but at a lower price."

-MacUser February, 1995

While it's great to get good press, this quote only begins to tell the whole story. True, the new EAsycolor 24<sup>™</sup> family of 24-bit high-performance graphics accelerator cards starts at \$1,299, far less than the Radius Thunder IV series (starting at \$2,599). And, they both feature Adobe Photoshop<sup>™</sup> filters and CMYK-to-RGB image acceleration in a 7<sup>™</sup> NuBus board design. But from there, EAsycolor 24's functionality goes much further.

**First, EAsycolor 24 cards feature the power and speed of a programmable RISC processor.** Radius still uses an ASIC design, which is yesterday's technology. RISC is state-of-the-art and gives you far more flexibility and performance.

Second, EAsycolor 24 cards offer faster QuickDraw™ acceleration. They also have more on-board VRAM than the Thunder line, and are much easier to upgrade for today's powerful new graphics software. So, you have all the color accuracy, resolution and power you need to work at the highest level of graphic design and production.

A family of cards are available so you can decide based on your needs and budget:

EAsycolor 24/1152 A great value, offering 24-bit acceleration at resolutions up to 1152x870.

EAsycolor 24/1360 For graphics and pre-press professionals who want power and performance for resolutions up to 1380x1040 at an attractive price.

EAsycolor 24/1600 Perfect for high-end users with demanding pre-press and document imaging applications at resolutions up to 1600x1200.

Call EA Research direct at 1-800-681-6566 to order.
Or call your favorite Mac reseller, including MacMall,
DTP Direct, and MacZone.
Circle 53 on reader service card

EA

The Creative Catalyst

EA Research, Inc. 2420 Camino Ramon Suite 212 San Ramon, CA 94583 Ph 510.867.0967 FAX 510.867.0684

## Macworld

EDITOR-IN-CHIEF

Adrian Mal

#### EDITORIAL

EXECUTIVE EDITORS

DIRECTOR OF EDITORIAL OPERATIONS

SENIOR EDITOR/FEATURES

SENIOR ASSOCIATE EDITOR/AT WORK

ASSOCIATE EDITOR/GRAPHICS

ASSOCIATE EDITOR/REVIEWS

ASSOCIATE EDITOR/REVIEWS

ASSOCIATE EDITOR/REVIEWS

ASSOCIATE EDITOR/REVIEWS

ASSOCIATE EDITOR/REW PRODUCTS

Galen Gruman, Carol Person

Jane Lagas

Charles Piller

Dan Littman

Tom Moran

Associate Editor/graphics

Cathy E. Abes

Wendy Sharp

Wendy Sharp

ASSOCIATE EDITOR/NEW PRODUCTS

Cameron Crotty

ASSOCIATE EDITOR/NETWORKS Elizabeth Dougherty
ASSISTANT EDITORS Suzanne Courteau,
Line Feeder, Longo Benefiction

Jim Feeley, Joanna Pearlstein

ADMINISTRATIVE ASSISTANTS

Matthew Hawn.

Lyn Taylor
ASSISTANT TO THE EDITOR-IN-CHIEF Elizabeth Maffly
CONTRIBUTING EDITORS Deborah Branscum,

Robert C. Eckhardt, Erfert Fenton, Jim Heid, Guy Kawasaki, Steven Levy, Cary Lu, Deke McClelland, Tom Negrino, David Pogue, Lon Poole, Steve Roth, Charles Seiter, Franklin N. Tessler

#### INTERNATIONAL EDITORS

Osmund Iversen, Australia, 011 61 2 439-5133;
Marianne Fajstrup, Denmark, 011 4536 44 28 00;
Michael Thevenet, France, 011 33 1 49 04 79 00;
Stephan Scherzer, Germany, 011 49 89 3 60860;
Enrico Lotti, Italy, 011 39 2 58 011660;
Osamu Honma, Japan, 011 81 3 5276-0541;
Shin Cho, Korea, 011 82 2 579-8031;
Paul Molenaar, Netherlands, 011 31 23 354554;
Toralv Ostvang, Norway, 011 47 22 05 3000;
Alvaro Ibariez, Spain, 011 34 1 319 4014;
Nicklas Mattsson, Sweden, 011 46 8667-9180;
Cuno Schneeberger, Switzerland, 011 41 1 387 4429;
Cemal Balci, Turkey, 011 90 1 279 1180;
Peter Worlock, United Kingdom, 011 4471 831-9252

#### LAB

LAB DIRECTOR Lauren L. Black
SENIOR TECHNICAL ANALYSTS Mark Hurlow,
Tim Warner
TECHNICAL ANALYSTS Matthew R. Clark,
Danny Lee

#### COPY EDIT AND EDITORIAL PRODUCTION

MANAGING EDITOR Charles Barrett
ASSISTANT MANAGING EDITOR Ruth Henrich
EDITORIAL PRODUCTION MANAGER
SENIOR COPY EDITOR
COPY EDITOR
D, Jacqueline Kan,
Paul King

Lisa Brazieal, Doreen Engelmann

#### ART AND DESIGN

PRODUCTION EDITORS

DESIGN DIRECTOR Dennis McLeod
ART DIRECTOR Joanne Hoffman
SENIOR DESIGNER Leslie Barton
SENIOR DESIGNER/INFORMATIONAL GRAPHICS Arne Hurty
ASSOCIATE ART DIRECTORS Sylvia Benvenuti, Kent Tayenaka
ASSOCIATE DESIGNER Tim Johnson
SENIOR DESIGN ASSOCIATE Martha Katt
DESIGN ASSOCIATE Belinda Chlouber

#### ONLINE

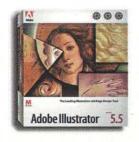
EDITOR Suzanne Stefanac
ONLINE ADMINISTRATOR Steve Costa
CONTENT ENGINEER Paul Devine
PRODUCTION ASSISTANT Kristine Moss



# TREETAND users UPGRADE to ADOBE ILLUSTRATOR FOR JUST \$149.

Today, you can artfully evolve to Adobe Illustrator<sup>™</sup> 5.5 for the Macintosh<sup>®</sup> at our very low upgrade price. Adobe Illustrator is the world's leading

illustration and page design program, and the latest version is loaded with features that add power and automate tasks once difficult or impossible in other drawing programs. It's part of a family of breakthrough Adobe" products, designed to further expand your creative options. But don't wait eons for evolution because this offer ends May 1, 1995.



Adobe Illustrator 5.5

Power Macintosh® Support 50 Plug-in Filters Adobe Acrobat® Software Multi-Colored Gradients

Trapping

Deluxe CD-ROM:

220 Typefaces Interactive Tutorial

"Design Quality" Clip Art

1-800-521-1976, Dept. D, Ext. 1262

Adobe, the Adobe logo, Adobe Illustrator, Adobe Acrobat, and the tagline, "If you can dream it, you can do it" are trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. All other marks and trademarks are the property of their respective companies. Offer subject to withdrawal. © 1995 Adobe Systems Incorporated. All rights reserved.

If you can dream it, you can do it."





#### AnthroCarts!

AnthroCarts will knock your socks off! Imagine how great it'll be when you find the perfect furniture for your equipment — just the right size, tough as nails construction and dozens of accessories.

And you'll find our service so real and responsive, you'll get a kick out of ordering direct!

Call for a free catalog!





Adjustable for all sizes.



Lots of choices.

Lifetime Warranty.

800-325-3841

6:00 AM to 6:00 PM PST, M-F e-mail: sales@anthro.com



10450 SW Manhasset Drive Tualatin Oregon 97062 Phone: (503) 691-2556 Fax: (800) 325-0045

GSA contract no. GS-OOF-5040A. Available for OEM applications. Prices from \$159.00 Anthro, AnthroCart and Technology Furniture are registered trademarks of Anthro.

# Macworld

#### ADVERTISING SALES

(415/978-3271) Lisa Buckingham BUSINESS MANAGER/AD SALES (415/974-7344) ADMINISTRATIVE ASSISTANTS Bethany A. Baller (415/978-3160) NATIONAL ACCOUNTS MANAGER Lois Brennan (415/978-3262) ACCOUNT EXECUTIVE Heather Miller (415/978-3257) Marsha Bowers NATIONAL ACCOUNTS MANAGER (415/978-3155) ACCOUNT EXECUTIVE Christine Wong (415/978-3192) Lianne Kirkland NATIONAL ACCOUNTS MANAGER (714/250-1307) Selin S. Gabriel ADMINISTRATIVE ASSISTANT (714/442-4023) NATIONAL ACCOUNTS MANAGER Cynthia Ramsey (212/586-5590) NATIONAL ACCOUNTS MANAGER Paul Bonarrigo (508/872-8600) ACCOUNT EXECUTIVE Io-Ann Sturtridge (415/978-3164) ADMINISTRATIVE ASSISTANT Alexandra Dileso (508/872-8600) NATIONAL ACCOUNTS MANAGER Lisa Ladle (708/827-4477) Jo-Ann Sturtridge ACCOUNT EXECUTIVE (415/978-3164) Kathy Poppenhagen (708/827-4477) ADMINISTRATIVE ASSISTANT Stephen R. Plevin DIRECTOR OF TELESALES OPERATIONS (415/978-3138) Edward Ramirez ACCOUNT MANAGERS/MAIL ORDER (415/974-7413) Lisa Weisberg (415/978-3117) 800/888-8622 MACWORLD SHOPPER Niki Stranz (415/978-3105),

#### MACWORLD GLOBAL PRODUCT SUPPORT CENTER

Carol Johnstone (415/978-3152),

Shannon Smith (415/974-7414)

DIRECTOR OF MARKETING AND
COMMUNICATIONS
Kimberlee A. Luedee
Technical manager
Chip Carman

#### MARKET RESEARCH

RESEARCH DIRECTOR Linda Lawrence
SENIOR RESEARCH ANALYST Jason Douglas
ASSOCIATE RESEARCH ANALYST Matt McAlister

#### MARKETING

MARKETING DIRECTOR Cynthia Koral
SENIOR MARKETING MANAGER Jeff Julian
MARKETING MANAGER Rhona Hamilton
TRADE SHOW/EVENTS COORDINATOR Anna Noctzel

#### CIRCULATION

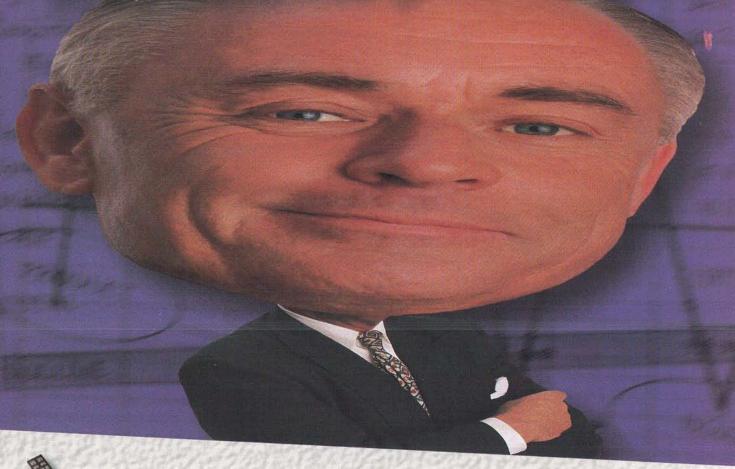
Angelina Beitia DIRECTOR OF CIRCULATION SINGLE-COPY SALES DIRECTOR George Clark CIRCULATION MANAGER Lori Hitchcock Martin Garchar **NEWSSTAND SALES MANAGER** SUBSCRIPTION MANAGER Elizabeth Jensen Kelvin Gee CIRCULATION ASSISTANT Eric Jue NEWSSTAND COORDINATOR Dalia Schwartz Deirdre Dugan SUBSCRIPTION COORDINATOR SUBSCRIPTION INQUIRIES 800/288-6848

#### PRODUCTION

VICE PRESIDENT/DIRECTOR OF MANUFACTURING
PRODUCTION MANAGER
BILLING INFORMATION MANAGER
AD TRAFFIC COORDINATOR
DIP COORDINATOR
BILLING ASSISTANT

Anne Foley Cynthia Mazzola So Fong Yip Shellie Anderson Clayton Haberman Lily Cheung

# Enlarge more than your next business presentation.





#### < New Z SERIES Panels

The all-new nVIEW Z SERIES LCD computer/video projection panels are the thinnest, most portable available—as light as 4.3 pounds. All the latest technology.

You are looking at a person who is definitely

on a roll—who is in that rare zone beyond the nth degree of satisfaction, about to burst with inner self-confident pride. And rightly so. He has just given his presentation of a lifetime.

The entire meeting was dazzled with the enlarged computer data and graphics projected on the large screen directly from the presenter's

own laptop. And awed with his linked control of multiple sources that let him instantly switch from bright giant video,

to laser disc, and back again to highcontrast computer output. As he added an impromptu comment to the screen, you could hear an excitement of success murmur through the room.

#### < New Improved

The nVIEW Luminator® LCD projector is now lighter, with 30% improved highcontrast color—and now shows-off images on a 15 foot diagonal screen. A real workhorse. Impressive. Very impressive. Our proud presenter had the newest, brightest, easiest, fastest, lightest, thinnest LCD computer projection panel—from *n*VIEW. And that's all that needs to be said.

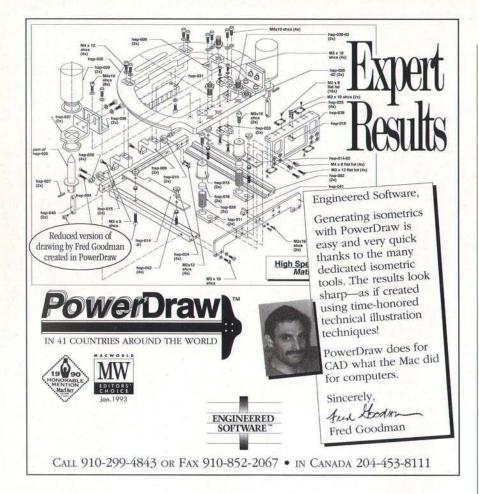
Being in that rare zone of bursting with confidence doesn't have to be rare for you anymore.

Call your local authorized nVIEW dealer for a no-obligation demonstration immediately.

For the nVIEW dealer nearest you, call

1-800-736-8439





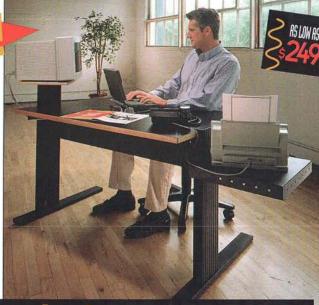
Circle 12 on reader service card





- Ergonomic
- Fully Adjustable
- Strong
- Guaranteed
- VAR Inquiries Welcome





Free Catalog! 800.688.2446

| Phone 503. 690.1400 | FAX 503. 690.1423 | Europe 011.41.62.631026 | Japan 011.81.3.3583.0436 | Japan 011.81.3.3583 | Japan 011.81.3583 | Japan 011.81.3.3583 | Japan 011.81.3583 | Japan 011.8188 | Japan 011.818

**HOW TO CONTACT MACWORLD** 

#### SUBSCRIPTION QUESTIONS

Mainland USA All other locations 800/288-6848 303/604-1465

or write Subscription Services P.O. Box 54529 Boulder, CO 80322-4529

MACWORLD ONLINE
Contact Macworld editors directly via the Macworld areas on America Online and eWorld. On these services, readers can search current and past issues, exchange messages with editors and other readers, and attend live online events. Readers can also send electronic mail via CompuServe (70370,702), MCI Mail (294-8078), AppleLink (Macworld1), or Internet (macworld@macworld.com).

MACWORLD IN MICROFORM

Macworld is available on microfilm and microfiche from UMI, 300 N. Zeeb Rd., Ann Arbor, MI 48106-1346; 313/761-4700.

BACK ISSUES OF MACWORLD

Write to Back Issues of Macworld, c/o Snyder Newell, Inc., P.O. Box 7046, San Francisco, CA 94120-9727; \$6 per issue (\$20 overseas). Prepayment in U.S. funds necessary. Make checks and money orders payable to Macworld Magazine.

MACWORLD EDITORIAL

MAIL OR COURIER Macworld Communications, Editorial Dept., 5th floor, 501 Second St., San Francisco, CA 94107; 415/243-0505.

AppleLink: Macworld1

CompuServe: 70370,702 Fax: 415/442-0766
LETTERS TO THE EDITOR All written comments, LETTERS TO THE EDITOR questions, and suggestions regarding any aspect of the magazine are read by our editor. We reserve the

right to edit all submissions; letters must include your name and address. Direct all correspondence (by mail

or electronically) to Letters to the Editor.

QUESTIONS AND QUICK TIPS Direct questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to Quick Tips, Lon Poole. Please include your name and address.

CONSUMER ADVOCATE Been burned? Really steamed? Direct your concerns (by mail or electronically) to Conspicuous Consumer, Deborah Branscum.

NEW PRODUCTS AND UPDATES Direct press releases and product announcements (by mail or electronically) and shrink-wrapped software upgrades (by

mail or courier) to New Products Editor. BUGS & TURKEYS Mail in descriptions of turkeys (flaws in conception or design) or bugs (defects or flaws in execution); copies of correspondence with vendor or telephone contact notes (if any); and your telephone number, mailing address, and T-shirt size.

STREETWISE SHOPPER To obtain an application for inclusion of special product promotions in Streetwise Shopper, vendors and resellers should contact Charles Barrett (by mail or electronically).
REPRINTS AND PHOTOCOPY PERMISSION Permission will be granted by the copyright owner for those registered with the Copyright Clearance Center (CCC) to photocopy any article herein—for personall or internal reference use only—for the flat fee of \$1.50 per copy of the article or any part thereof. Specify ISSN 0741-8647 and send payment directly to the CCC at 27 Congress St., Salem, MA 01970. Address requests for reprint orders and for permission to copy editorial for other purposes to Reprints

and Permissions, Editorial Dept.
WRITING FOR MACWORLD Do not send us unsolicited manuscripts. If you're interested in writing for Macworld, send a stamped, self-addressed envelope along with a request for our writer's guidelines. Direct (by mail) to Writer's Guidelines, Editorial Dept.

FOUNDING EDITOR

Andrew Fluegelman 1943-1985

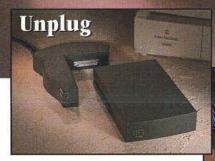
Macworld is a publication of Macworld Communications, Inc. Macworld Macworld is a publication of Macworld Communications, Inc. Macworld is an independent journal not affiliated with Apple Computer, Inc. Macworld, Macworld Interactive, Macworld Shopper, MW, MW Lab, MW Shopper, Desktop Critic, Quick Tips, Star Ratings, and Conspicuous Consumer are registered trademarks of International Data Group, Inc. Power PC World is a trademark of IDG, Inc. APPLE, the APPLE LOGO, MAC, and MACLITTOSH are registered trademarks, and MACLITER and POWERBOOK are trademarks of Apple Computer, Inc. Printed in the United States of America. Copyright © 1995 Macworld Communications, Inc. All rights reserved. Macworld is a member of IDG Communications, the world's largest publisher of computer-related information.





# The Joule Portable. "Snazzy, Stylish Storage" MacUser - Dec. 1994 \$333

Joule Portable includes Dock



Joule 730MB Portable

Featuring Superior
QUANTUM
Mechanisms

Now A Compact Hard Drive Without Compromises... Plus Joule's Valuable System Compatibility.

Why buy a conventional hard drive when you can get all the advantages of a Joule for no more? In our competitive trials Joule is the smallest, the lightest, the quietest, and the most portable full-size drive. Only Joule gives you the added value of stand-alone operation, portability or integration into the acclaimed Joule Modular Storage System.

Joule Portable drives give you all the features you expect and more: Quickset™ adapters for easy plug and play, La Cie Term™ switchable active SCSI termination for a clean signal, up-front switch and activity lights, dual connectors for daisy chaining, and SilverLining™ 5.6 disk management software. Available exclusively from La Cie, a Quantum company, Joule drives offer a superior warranty and Quantum's Fortune 500® stability so

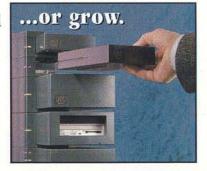
you can buy with confidence.











LACIE

To order call toll free:

...and go

800-999-1383

Mon.-Fri. 5AM-7PM & Sat. 8AM-Noon PST • International 503-520-9000 Fax 503-520-9100 (24 hrs.

\* Call for details, conditions, limited money back quarantee, and the others. Prices do not include shipping and only apply to products shipped within the confinental United States. Add sales far where applicable. Joule, Joule, Portable, Quickset, La Cie Term, Shertning, La Cie and the La Cie logo are leadmants of La Cie, Lib., a Disantan Company. All other trademants are the property of their respective companies. All prices, specifications, terms, warranties, descriptions, products and services feerin are subject chance without nucleon or without recourse. Occupied 1994 La Lib. Lib. All ristricts received in a subject chance without nucleon or without recourse. Colorabil 1994 Lib. Lib. All ristricts received and subject chances without nucleon or without necessary.

The Joule Advantages

Joule Portable Hard Drives Portable or removable storage drives can be used alone or in a stack.

can be along a silverliming.

540MB Hard Drive

19

The Joule Portable features high performance hard drives from Quantum for advanced drive technology. Modules with mounts are also a snap to install in a single, vertically interlocked system.

Joule Portable Joule Module Internal Drive with Dock with Mount with Bracket

3.5" HARD DRIVES - Quantum - 2 or 5 Year Warranties

	0.0 HAND DI	HALO - duantum	- 2 UI J IGAI VVAITAINIG	3
Limite	170MB	\$219	\$219	\$159
Supp	270MB	\$259	\$259	\$189
	340MB	<b>\$269</b>	\$269	\$209
	540MB	\$319	\$319	\$259
HO	1.730MB	\$379	\$379	\$319
1	1080MB	\$669	<b>\$669</b>	\$599
	1337MB	\$1069	<b>\$1069</b>	\$999
	1400MB	\$879	\$879	\$819
	2.5" HARD DE	RIVES - Quantum	1 – 2 Year Warranty	
	170MB	\$299	<b>\$299</b>	\$239
	256MB	\$369	\$369	\$299
	340MB	\$449	\$449	\$389
	514MB	<b>\$569</b>	\$569	\$499
				1

Fujitsu 230MB
Optical With FREE
3.5" Cartridge

Joule
Removable
Media Drives

Units shown
with Portable
Dock

SyQuest
270MB With FREE
270MB 3.5" Cartridge

Only Joule removable media

drives give you our modular system advantages <u>and</u> portability. Choose from SyQuest<sup>®</sup>, Fujitsu Optical, DAT and Tape Drives in either stand-alone Portable or stackable Modules with Mount to extend your Joule Base. Or select an internal drive for use in your Mac.

director doc	in jour mi			
and the same	Portable	Module	7,7	nternal
	Drive	with Mount		with
30 Day	with Dock	(for use with Base)	В	Iracket
Money Back	230MB F	UJITSU OPTICAL-V	Vith FREE 3	.5" Cartridge
Money Back Guarantee*	<b>\$799</b>	\$799	\$7	729
"	SYQUEST	DRIVES - With 1 FREE	SyQuest Ca	nrtridge
105MB	\$369	\$369	\$2	299
270MB	\$499	\$499	\$4	59
88MB	88MB & 200MB	SyQuest Drive available t and internal versions	\$3	169
200MB	only. Add \$60 for configuration.	r Zero Footprint Case	\$4	139
TAPE DRIVE	Includes 1 FREE D	OAT Tape & Comes With Reti	rospect™	
600MB	<b>\$789</b>	\$789	\$7	29
DAT TAPE DRIV	VE - Includes 1	FREE DAT Tape & Comes V	Vith Retrosp	nect <sup>TM</sup>
8.0GB \$	1199	\$1199	\$11	49
SILVERLIN	ING 5.6 – Ha	rd Disk Management Softwa	re	\$99
REMOVAB	LE CARTRID	GES		
44MB	SyQuest \$	59 105MB S	yQuest	§69
88MB	SyQuest \$	79 270MB S	The same of the sa	\$79
	SyQuest \$	39 230MB		\$49
ZUUIVID	Oy QUEST	ZOUIVID	Optical	-

LACLE LIMITED A QUANTUM COMPANY

JOULE PORTABLE DOCK without drive
3.5" ZERO FOOTPRINT CASE HARD DRIVES

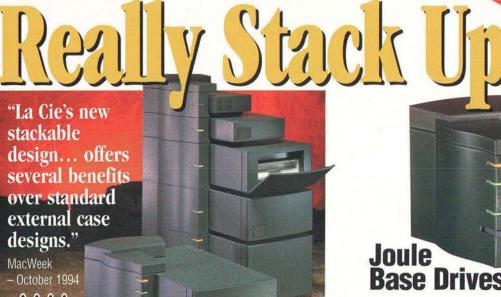
- Quantum - 2 or 5 Year Warranties

2100MB 2148MB 4300MB

To order call toll free:

800-999-1383

Mon.-Fri. 5AM-7PM & Sat. 8AM-NOON PST • International 503-520-9000 Fax 503-520-9100 (24 hrs.)



- Simple, easy installation.
- Support hard or removable drives.
- Easy SCSI ID switching and digital active SCSI termination.
- Single surge protected power supply supports all modules.
- All modules removable without reconfiguring system.



Joule Base Drives

Ioule Base Drives stand alone or serve 1400MB as the foundation to a uniquely expandable Joule Tower. Bases are available with Hard Drive, Optical or SyQuest® mechanisms and include all the Joule advantages.

#### 3.5" HARD DRIVES

- Quantum - 2 or 5 Year Warranty - Fujitsu Optical\*

Cancel OK Brightness: Contrast

340MB **540MB** 730MB

1080MB 1337MB

1400MB

#### REMOVABLE DRIVES

230MB

\* Includes 1 FREE 3.5" Cartridge

**REMOVABLE DRIVES-SyQuest\*** 

270MB

\$549

\* Includes 1 FREE Cartridge

**JOULE BASE** 

- Without Drive

Preview \* Q . . . 1 . . . 7 . . . 7 . . . 4 . . .

§199

NOW MAKE YOUR OWN QUALITY SEPARATIONS

#### SILVERSCANNER III

#### BETTER THAN EVER. . . All

new design. Gorgeous color. Fine 10 bits per color! image detail. Excellent tonal range. Get production quality output from an inexpensive flatbed scanner with Silverscanner III. Easy for beginners, yet with all the powerful control the advanced user craves.

#### **PACKAGE 1**

Silverscanner III with Color It! & Read-It OCR Pro.

Transparency Adapter

2400 dpi scanning power!

One pass scanning!

Dynamic color preview!

▶ Electronic densitometer. automatic tone adjustment & color histogram - all interactive in preview!

#### **PACKAGE 2**

Silverscanner III with Photoshop & Read-It OCR Pro.

Sheet Feeder Attachment





# Build A Tower of KAID Power For Less



**Features** Plug & Play Cordless Modules...

**Joule Is The New Standard** For Performance, Security, and Value In RAID Systems... Starting At 2.0 GB - \$1899

Satisfy your growing appetite for mass

storage and dramatically improve data security for less money than ever. Only Joule RAID Systems combine a full range of performance options like

drive striping, mirroring and error correction along with Joule's popular new modular

advantages. Advantages like easy system expansion and reliable data transport using cable-free, portable



Supports Removable Media **Drives Too!** 

modules which can be removed, shared or locked

away with ease. Joule RAID even lets you add optical, tape and SyQuest modules for further versatility.

Joule RAID is available now in systems from 2 to 16.8Gb with levels 0,1,4 and 5 included in each system. Only Joule gives you so much more for so little. Call today for the whole RAID story.

To order call toll free:

4.28GB



BY ADRIAN MELLO

#### Cloning Opportunities

How clones can succeed by satisfying customers

NLY A FEW MONTHS AFTER Apple publicly committed to licensing the Macintosh Operating System, the floodgates are open and the first Mac clones are rushing into view. Last issue, Macworld reported that both Radius and Power Computing Corporation announced their intention to produce the first Mac clones (see News, March 1995). Apple is pinning its hopes on licensing to increase the Mac's market share in the face of the onslaught of Wintel (Windows/Intel) machines. But there are many challenges facing Apple and clone makers along the way to producing a broader and more successful Mac market.

As the sole systems vendor in its own market, Apple's life was difficult enough. Now, Apple has a much bigger and trickier task in supporting clone makers while competing with them. Clone makers, to build their businesses, will have to identify the opportunities outside the current Mac market and approach them effectively. And we as customers are likely to face many new choices while clone makers explore these alternatives. On the whole, these choices should be good for the Mac community, but there will likely be some pitfalls along the way that both users and Mac-clone makers need to avoid.

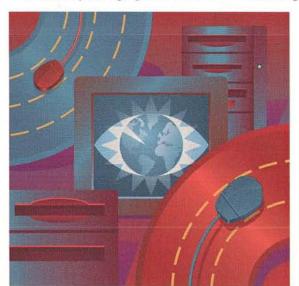
Why do clone makers think they can succeed in a market Apple dominates? Historical precedent: IBM clones. But clone makers must compete against Apple's powerful brands, its entrenched position, and formidable customer loyalty.

There are several questions clone makers will have to answer correctly to create a successful business strategy. Should clone makers attempt to undercut Apple by offering low-cost computers, or should they adopt a value-added approach by selling high-performance computer models with lots of features? Do they go after education sales, or should they concentrate on corporations? Should they sell their products by phone and mail or through retail stores? Finally, what kind of identities can they build to distinguish their companies and products?

More for Less

Apple offers an amazing array of sophisticated products, so at first it's hard to think of what else a clone maker could offer. But imagine getting more for less. Clones could provide better standard equipment, such as higher-capacity hard drives or more memory. If two systems have similar performance, features, and prices, but one includes a 230MB hard disk, 8MB of RAM, and Apple's known quality, and the other is a clone that includes a 1GB hard disk and 16MB of RAM, which one would you choose? Other improvements might include builtin Ethernet transceivers or quadruplespeed CD-ROM drives, instead of dualspeed CD-ROM drives.

Of course, providing more for less is hard. A few years ago potential clone



makers drooled at the thought of competing against Apple, which had huge profit margins relative to the margins in the PC market. Recently Apple has closed that margin gap. (There are a couple of exceptions: the high-end Power Mac 8100 remains relatively expensive, as do the higher-end PowerBooks.) Wintel clone vendors survived because of their lower overhead compared with IBM's, especially in R&D. Many reduce overhead by selling direct, so they can offer better standard equipment.

In addition to providing better standard equipment, Macintosh clones could also build in new hardware options. Why not include an affordable tape-backup device for personal users? Maybe create a dual-CPU DOS-and-Mac system something like Apple's DOS Compatible, except integrated at the motherboard level, eliminating the two sets of I/O. Other options could include PCMCIA or Access.bus, drives that lock physically, and VGA ports.

#### **Custom Clones**

Clone makers also have a chance to offer customers more options for initial configuration. Apple sells complete, take-itor-leave-it systems. Dealers hate this approach, and some will swap drives and RAM among systems to make a customer

> happy. But dealers would much rather get an unencumbered machine and a bunch of components and assemble what their customers want.

> Over time, customers also want to upgrade their computers. But they don't want to throw out perfectly good components, peripherals, and cards just because they are upgrading a motherboard or some other piece of their system. It's a compelling issue for people who must spend thousands of dollars, and it explains why Mac owners keep their IIci's long after a PC owner would have up-

graded the motherboard. Clone makers could build an entire strategy on providing sensible upgrade paths that let users preserve their hardware investments.

Clone makers could offer computers with both PCI and NuBus expansion slots, saving customers from throwing out any NuBus cards they already have as they upgrade, or simply letting them choose the best card for a task regardless of what bus it's for. Supporting multiple buses is common in the PC universe.

continues

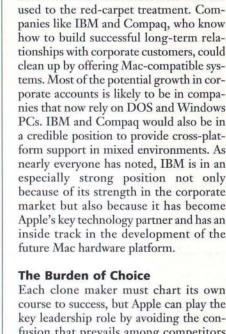
#### **First Clones Arrive**

With all this in mind, let's examine the real-world examples. Radius, for one, appears to be taking aim at limited but lucrative markets as a value-added reseller (VAR). Radius clones are intended for customers who need to apply a lot of system power to their tasks in color prepress, imaging, and video production (see the feature "First Clones" in this issue for more details). Radius has already built a strong customer base in these areas.

Radius can offer systems tailor-made for production environments, which often require everything from disk arrays to special-purpose video cards.

If Radius is at one end of the spectrum, Power Computing is at the other. Power Computing's strategy is exactly the "more for less" described earlier. Instead of selling through traditional retail outlets, Power Computing plans to focus on direct sales, while trying to build a reputation for solid engineering and good value. This makes sense because Apple has forgone direct sales at a discount.

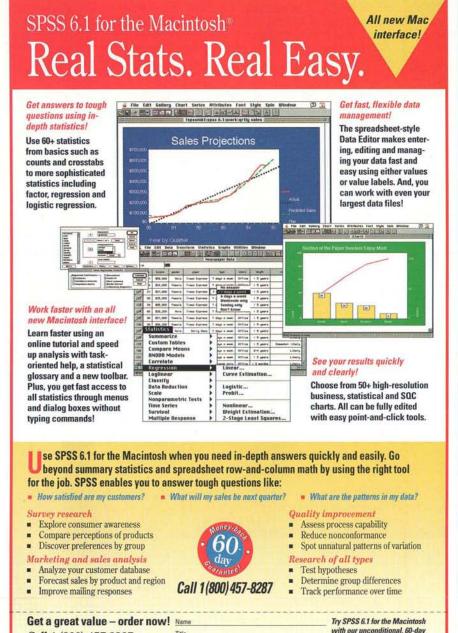
Perhaps the biggest plum left on the tree is the corporate market. These customers spend more on installing and maintaining computers than any other group. Apple's lack of success in this market is well known. It has failed to build enough good relationships with purchasers in large companies. The word on that street is that Apple sales reps frequently told corporate buyers what they needed instead of listening first. This doesn't sit well with customers who are used to the red-carpet treatment. Companies like IBM and Compaq, who know how to build successful long-term relationships with corporate customers, could clean up by offering Mac-compatible systems. Most of the potential growth in corporate accounts is likely to be in companies that now rely on DOS and Windows PCs. IBM and Compaq would also be in a credible position to provide cross-platform support in mixed environments. As nearly everyone has noted, IBM is in an especially strong position not only because of its strength in the corporate market but also because it has become Apple's key technology partner and has an inside track in the development of the



course to success, but Apple can play the key leadership role by avoiding the confusion that prevails among competitors in the PC marketplace. Next month I'll explain what a tremendous challenge this is and how Apple can rise to the occasion.

Clones will create an array of new choices that will add needed strength to the Mac universe but also create confusion. Customers will have to juggle many new choices while staying alert to differences in product quality, features, and customer support.

Macworld's commitment is to provide you with the most in-depth information and product guidance to help with difficult purchasing decisions. In this issue, Macworld Lab carries out the first extensive performance and compatibility tests of Macintosh clones to help you determine how viable these alternatives to Apple-branded Macs really are. We'll also help you understand what lies down the road. That's why we've included a companion story describing future clones likely to result when Apple and IBM finish building their shared hardware platform (see "Mac Hybrids"). We've been clamoring for clones for years-now that they're arriving, they present new opportunities and new challenges. m



Email

State

em «Madrid «Munich »New Delhi «Paris » Singapore «Stockholm «Sydney » Tokyo »And distributors world

A8287

Organization

Address

City

money-back quarantee.

Real Stats. Real Easy."

Call 1 (800) 457-8287

or mail to: SPSS Inc., 444 N. Michigan Ave.

American Express, Discover, MasterCard,

Chicago • Washington, D.C. • Bologna • Chertsey • Gorinche

VISA and I.M.P.A.C. cards accepted

or Fax 1 (800) 841-0064

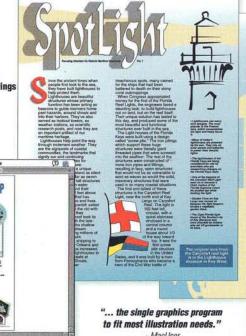
Chicago, IL 60611

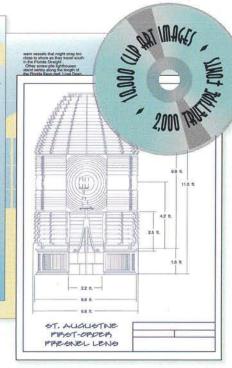
# YOUR ONE-STOP GRAPHICS SHOP

#### **CANVAS Does it All!**

- Newsletters and Flyers
- Logos and Advertising Design
- Free-form Drawing and Painting
- Business Graphics, Flow Charts & Diagrams
- · Floor Plans, Architectural & Technical Drawings
- On-Screen Presentations and Slides
- . Retouch, Color or Trace Scanned Images
- Color Separations
- Spectacular Special Effects



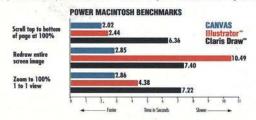




# "With CANVAS", 10,000 clip art images, 2,000 fonts and Power Mac" acceleration, you'll always finish first."

#### THE EASY-TO-USE DRAWING PROGRAM FOR BUSINESS, DESIGN, TECHNICAL ILLUSTRATION AND MORE!

Canvas gives you the power to complete any graphics project without bouncing around between half a dozen applications. With its award-winning, intuitive interface, Canvas lets you draw, layout, paint, present, apply a multitude of sophisticated special effects — and take your work all the way to finished film.



#### Accelerated for Power Macintosh

#### **EXCLUSIVE NEW CD-ROM JUMP STARTS YOUR CREATIVITY**

Canvas comes with a premium CD jam-packed with 10,000 clip art images ready-made for your newsletters, signs, sales presentations and diagrams. These fully editable images make a perfect starting point for any graphics project! You also get over 2,000 professional TrueType™ text, display and novelty fonts — more than any other package at any price!

#### (1)









#### SO WHAT ARE YOU WAITING FOR?

Run today to your favorite software retailer or call us and get your hands on the best graphics software buy around.

"... the best object-oriented drawing program money can buy." - MacWEEK

"... this multi-purpose drawing and painting application is power-packed." - Computer Pictures

"... when it comes to texthandling, Canvas' features rival those of Illustrator." - MacUser

#### \$269 Estimated Street Price

#### **CANVAS INCLUDES**

- Unlimited Free Technical Support
- · 60-Day, Risk-Free Money-Back Guarantee
- CD-ROM with 10,000 clip art images & 2,000 TrueType Fonts

#### \$149<sup>55</sup> Competitive Upgrade Price

#### COMPETITIVE UPGRADE

 Simply show us proof of ownership of any Macintosh graphics program and chop nearly \$250 off Canvas' already low \$399 price! Call today...

1-800-733-6322



### Introducing Macintosh System 7.5. It can

#### Drag-and-Drop printing.

Avoid lines when working on your network. You can print documents simply by using icons on your desktop. To print a file, just drag it onto a printer icon. To change printers, just drop the file onto a different printer icon.

#### Macintosh PC Exchange."

It's built in, so now you can easily share documents with DOS and Windows users, view the contents of DOS disks as if they came from another Mac, and open and edit files even when you don't have the applications they were created in.

#### Enhanced desktop.

Faster and easier access to items in your Apple menu. Track and retrieve your most recently used applications, documents and servers more quickly. Create convenient, on-screen notes with new electronic Stickies.

#### EMPLOYEE EVALUATION

NAME: Chris Wolfe DATE PREPARED: 9-8-94

TITLE: Product Manager

**DEPARTMENT:** Account Management

#### OVERALL PERFORMANCE:

Commendable Satisfactory Needs Improvement

#### COMMENTS:

Chris has become an indispensable member of the account team. He has demonstrated a high level of motivation and enthusiasm for the job. Perhaps the most compelling evidence of this can be found in his ability to work independently, where he picks up new tasks easily with little need for supervision or instruction. He consistently recognizes and works around obstacles to maintain productivity. Consequently, he often completes assignments ahead of schedule. At a time when collaboration is more critical than ever, Chris has also proven to be an excellent team player. He works effectively with coworkers on projects where teamwork is essential, and can easily motivate and inspire others to achieve. When delegating tasks, his thoughts are well organized and his ideas clearly articulated - an indication of his excellent communication skills. His projects are all distinguished by an attention to detail. His conclusions are always sound and logical. And he excels in time management, effectively compiling and analyzing information. He always manages to work efficiently, setting an example for effort throughout the company. Promotion and appropriate compensation are recommended at this time.

Chris Wolfe Employee's Signature

## upgrade your career.

Apple Guide.
Learn by doing.
Apple Guide can teach you how to use your Macintosh and new applications by walking you through tasks and procedures step by step. On-screen instructions literally point to and highlight the step being described.

#### Universal Mailbox.

Keep track of how to communicate with people. This single mailbox automatically combines and sorts all your incoming and outgoing mail—including on-line services, e-mail, voice mail, faxes and other messages.

AppleScript."

You know those tasks you repeat over and over? With AppleScript.



With AppleScript, you can automate a series of actions you perform frequently and repeat them with a single keystroke. Leaving more room for work—and less room for error.

Today, everybody keeps telling you to work smarter, not harder. Wouldn't it be nice if someone finally told you how? Introducing Macintosh® System 7.5. The latest version of the

of more than 50 refinements that will do more than simply change the way your Macintosh works—they'll change the way you work.

Making you more productive than ever.

For starters, Macintosh System 7.5 enables you to collaborate with others much more effectively.

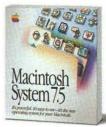
It speeds up repetitive tasks, makes it possible to send and receive mail from a variety of sources through a single mailbox, lets you swap files with PCs and allows you to open Macintosh, DOS and Windows documents − even when you don't have the applications used to create them.

When it's time to print, you can do so quickly by using simple icons right on your desktop.

You can even teach yourself how to use your Mac™and new applications with the Apple® Guide, as it literally walks you through procedures, step by step.

See your Apple

dealer now.



Ultimately, it's all about giving you more of everything you buy a Macintosh for in the first place. More power. More performance. More simplicity. More Macintosh.

For the name and location of an authorized Apple software reseller near you, call 800-538-9696, ext. 250.

Because with the new power of Macintosh, there's really no telling how far you'll be able to go.

The power to be your best."

#### EXPLOREMEINTERNET!



#### FIVE HOUR FREE TRIAL!\*

Dial By Modem 1-800-365-4636, Press return until you get a prompt At Username, enter JOINDELPHI. At Password, Enter MW495

\*Free offer applies to new members only; limit one per household; and is valid for a limited time. A valid credit card is required for immediate access. Free time may be used only during the remainder of the calendar month of becoming a member. Telcom surcharges apply during business hours (6 am to 6 pm weekdays) via Tymnet or SprintNet and for access outside the mainland U.S. New members must agree to Terms and Conditions of membership when joining. Complete details and other restrictions are provided during the toll-free registration. DELPHI INTERNET is a trademark of Delphi Internet Services Corporation.

Attention Current Internet Users: See what DELPHI can offer you! Stock quotes, Grolier's Encyclopedia, newswires, and hundreds of other services are just a few keystrokes away. Telnet to delphi.com and enter the username and password above for a free trial.

# FREE

Delphi Internet™ offers you full access to the Internet and now you can explore this incredible resource with no risk. You get 5 hours of evening and weekend access to try it out for free!\*

Use Delphi Internet's
mail gateway to exchange
messages with over 30 million
people at universities,
companies, and other online
services such as CompuServe® and MCI Mail®.
Download programs and files from all over
the world using FTP or connect in real-time
to other networks using Telnet. You can
also meet people on the Internet. Internet
Relay Chat lets you "talk" with people all
over the world and Usenet News is the
world's largest bulletin board with over
20,000 topics!

To help you find the information you want, you'll have direct access to powerful search utilities such as **Gopher**, **HyteInet** and **WAIS**. If you aren't familiar with these terms, don't worry; Delphi Internet has expert online assistants and a large collection of help files, books, programs, and other resources to help get you started.

Over 850 local access numbers are available across the country. Explore Delphi Internet today. You'll be amazed by what you discover.



Questions? Call 1-800-695-4005. Send e-mail to INFO@delphi.com

1994 © Delphi Internet Services Corporation

Circle 173 on reader service card

Microsoft Takes It on the Chin

S A FAITHFUL USER SINCE VERSION 1, I must strongly disagree with your review of Microsoft Works 4.0 in the January 1995 issue.

I have been using 4.0 for some time now on a Macintosh LC III with 16MB of RAM and two 256MB hard drives, and I sorely wish I could easily downgrade my files back to version 3, as I have encountered serious problems.

Saving files is slow, and when I say slow I don't mean a simple delay, I mean go-get-a-cup-of-coffee slow. A 190K database document can easily take up to 60 seconds to save, sometimes longer, and just saving a one-word change to a 4K letter can run 20 seconds or more.

You must view all documents in page view and thus lose a lot of screen real estate to white space (margins, header, and so forth). Carefully resizing the window and centering the document becomes tiresome quickly. Upon calling Microsoft, I was informed that permanent page view was a new feature and not a problem. Obviously all developers must have 21-inch-plus screens, much larger than my measly 13-inch display.

If the Works 3.0 file I want to open is too large (and there is no real indicator of what constitutes "too large"), the program crashes, losing everything in progress at the time. Hardly an elegant failure mode. The only fix is to give Works 4 a lot of memory to play in.

Andrew Bennett Cambridge, Massachusetts

OUR REVIEW OF MICROSOFT WORKS 4.0 left my mouth agape. Could you have tested the same program that has randomly locked up each of the four computers on which I currently have it installed (Classic II, LC 550, LC 575)?

Did you try opening a file created in an earlier version in Works 4.0? A set of lecture notes that we saved as a 3-page

document in 3.0 might open as a 26-page document in 4.0.

What is Microsoft doing about all this? I will say that the tech-support people are courteous. Of course, you must foot the bill to call them, a call that may have you on hold for 25 to 30 minutes. They will tell you to turn on virtual memory and make a larger RAM cache. This only makes the program slower than it already is, and believe me, it is slow.

They say help is on the way. A patch of some sort will ship to those who have called, complained, and gotten their name on a list. But Microsoft admits that this patch will not address all the problems.

How you could possibly have come up with three stars for this product is completely mystifying.

Alfred R. de Jaager via the Internet

It's true that you are restricted to page view in Works 4.0, but we didn't consider this a problem, upholding as it does the WYSIWYG standard that the Macintosh helped pioneer. Incidentally, ClarisWorks also displays documents in page view only. We never encountered the slow saving problem detailed by Mr. Bennett. Microsoft acknowledges that there are problems with Works 4.0 opening version 3.0 documents that contain bullets or custom page breaks; the problems stem from Works 4.0's new text-editing engine. A free patch is available that irons out those bugs-the patch updates the program to version 4.0b. Readers can call Microsoft customer service at 800/426-9400, or product support at 206/936-7160.-Ed.

Y IAW DROPPED SEVERAL TIMES while I was reading your review of Microsoft Excel 5.0 in the January 1995 issue-most notably when you mentioned that it took "24MB of RAM" to run comfortably. Wow! It would take the RAM from four of the Macs in our office to achieve that mind-numbing total. If this were your April issue, I'd be sure this was a check of my credulity.

Microsoft has missed the boat on this product, as well as Word 6.0. There are lots of Macintosh users who are like hell going to invest in the kind of RAM necessary to run these new programs.

As for me, my new motto: "Upgrade? What upgrade?"

Frank Shaw Portland, Oregon

JUST RECEIVED MY LATEST ISSUE OF Macworld, with the words "The Macintosh Authority" emblazoned on the cover. After reading your review of Microsoft Excel 5.0, I wonder how on earth you could possibly give this sluggish, overrated, unwieldy piece of software hubris four stars? The review makes clear that Excel 5 takes Microsoft's talent for overcomplexity, bad user interfaces, and gross obesity to new heights.

Case in point: your tests showed that Excel 5.0 performs recalculations twice as slowly on the 6100/60 as on a 66MHz Pentium. I have seen published tests using Painter, Photoshop, Mathematica, and SPECmarks, and in each case the Power Macintosh 6100/60 has trounced the 66MHz Pentium's FPU performance. Either Microsoft is grossly incompetent,

continues



#### PayCheck offers

- Easy to use, Icon Interface
- Simple Installation & Setup
- Process Checks in 2-4 seconds

MYM®, CheckWriter Prom

MYOB®, MacMoney®, A4®

and most other software!

- 30 Day Money Back Policy
- Built-in Time Card Calculator
- Calculates all Taxes
- Calculate Deducts/Employer items
- Calculates SUTA, FUTA, SDI
- Child Support Deduction
- Prints Tax Reminder Calender
- Prints detailed Paychecks/Stubs Prints W2's and W3
- Reports:940, 941, 942, YTD, more

#### Payroll adds

- Up to 1000 Employees
- Prints complete 941,942,943,W2
- **Custom Report Creation**
- More deductions & income

#### Ultimate Payroll has more!

- · Review/Reprimand Info
- Check Register, prints tax checks
- Vacation/Sick Tracking
- Prints 1099's
- Optional California DE3
- Optional Electronic W2 exporting
- Optional Direct Deposit (ACH)
- School & Payroll Service versions

Aatrix Software...a Macintosh payroll developer since 1985. There isn't a payroll situation Aatrix can't handle! In fact we're so sure that you'll love it, we have a 30 day money back policy.

#### Information or Orders 800-426-0854

\* \$49 price is guaranteed by calling Aatrix directly \*trademarks are property of their respective manufacturers.

- The correct phone number for Mosaic Communications in "Mosaic Goes Commercial" (News, January 1995) is 415/254-1900. Also, the company has since changed its name to Netscape Communications.
- Polacolor Pro 100, a new instant color film designed for professional photographers, is made by Polaroid, not Kodak ("Easy Color Separations," Graphics news, January 1995).

or it doesn't really care about making Excel "accelerated for Power Macintosh." Attention, other software companies: here's your chance to pop this overblown balloon of a spreadsheet.

Mic Chaudoir via the Internet

#### Featherweight Champ

INALLY! WENDY SHARP RECOGNIZES that the Duo makes a great first or second computer ("What's the Best Portable?," January 1995). I've been telling people that for a year-the Duo is a well-designed, light, small, we-don'tneed-no-stinkin'-mess-o'-cables machine with better batteries than the all-in-one PowerBooks. Thanks for daring to take an unpopular stand, Wendy-the facts bear you out on this one.

Paul Collins San Mateo, California

ENJOYED THE ARTICLE ABOUT THE Duo 280c versus the PowerBook 540c in January's Macworld, and it summarizes the dilemma facing buyers of these two systems. I ended up with a Duo and am happy with its portability compared with a 100-series PowerBook, even though the lack of an immediate floppy or SCSI output can be a pain when you suddenly realize that an extension is missing or a file needs to be updated.

I do have one big grouse, though. It has been impossible to get a Type III intelligent battery of late (and I have tried many sources), or a recharger that works for these batteries. Perhaps Apple can redesign the next generation of Power-Books to use generic peripherals that the much larger PC base uses.

Michael Chee via the Internet

HAVE BEEN USING A POWERBOOK 165 for a year now, and the main reason I chose it over a Duo was its built-in floppy drive. Now that I have it, I am eternally grateful for the ADB port. I regularly use a numeric keypad and would hate to live without it.

How tiring can it be to carry around 10 pounds instead of 7? I'll gladly lug 3 whole extra pounds to have everything in one package rather than realize I've left part of my docking station at home. Besides, having worked with MIDI for several years, I've learned that the more components you have to plug in, the more chances there are for something to break down.

Dan Meredith Warfordsburg, Pennsylvania

#### **Emissions Politics**

RATHER THAN ENCOURAGE GOVERN-ment spending on magnetic-field research, I encourage you to include an address for contributions for the Center for VDT and Health Research, at Johns Hopkins (Conspicuous Consumer, December 1994). Every dollar comes out of my pocket eventually. I would rather have 100 percent of my money go to actual research than pay for the overhead of government bureaucracy.

> Thane Eichenauer Tempe, Arizona

Dr. Ronald Gray (410/955-7818; fax 410/955-0792) is director of the Center for VDT and Health Research at Johns Hopkins University. Phil Shellhouse of IBM serves as the administrator for the foundation. He can be reached at 202/515-5080.-Ed.

#### Expert Graphics Copywrong

LOOK FORWARD TO EACH NEW ISSUE of Macworld to try (in vain) to keep up with what's goin' on in MacSpace. Without your magazine, I'd have to quit working just to make enough time to keep up with operating-system enhancements and new hardware architecture. Truth is, I would probably just wander around Myst all day until I was reduced to a drooling shell of my former self. Keep doin' what you're doin'.

But the Expert Graphics how-to with the image by Annabelle Breakey (January 1995) has me scratching my highly reflective scalp. Did I miss something? When did wrapping paper (and the images therein contained) fall into the public domain? Was it simply understood that Ms. Breakey owned the wrapping-paper company, or that she had express written permission to sample the paper for use in the manufacture of a product for resale? continues

# RECORDABLE CD!

#### The New Pinnacle RCD-1000 is 3 Drives in 1

Recordable CD System

Oouble-speed CD-ROM Player

Tape Backup Replacement

The RCD-1000<sup>™</sup> is virtually 3 drives in 1 - making it the ultimate storage device for only \$1995.

With the flexibility of Pinnacle's
RCD-1000, the applications are endless.
As a CD Recorder, the RCD-1000 allows
you to master your own CD that can be
easily transported across town - or to the
end of the world. As a double-speed
CD-ROM player, it can read virtually
thousands of educational, multimedia or
audio CDs. And, with Pinnacle's own
Backup Software Utility, you can
now replace your tape drive with a system

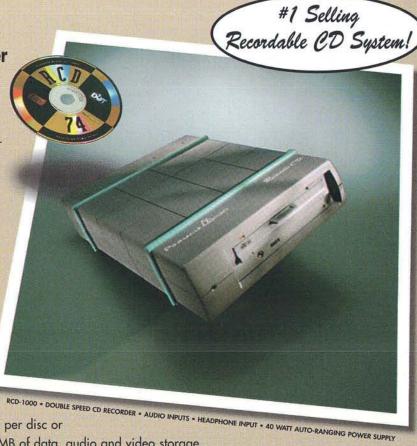
that provides a more reliable solution and fast random access to your data for only \$29 per disc or

4 cents per megabyte. Each disc holds 650 MB of data, audio and video storage.

The RCD-1000 is perfect for creating and mastering your own multimedia titles, interactive games or even mixing your own audio CD of your favorite tunes. You can backup accounting records, business plans, charts and graphs, or confidential information on CDs for decades - safe and secure.

The RCD-1000 system is simply the best way to store, archive, distribute and create information. Best of all, it's now affordable. You can spend more money on three different systems, or call one source for all your needs.

Pinnacle Micro. The Optical Storage Leader.



#### →→→ FEATURES ←←←

#### 1 RECORDABLE CD SYSTEM

- → CD maker
- Double speed recorder
- Supports standard recordable CD media, 74 min./650 MB
- ⇒ 5.25" half-height internal or external
- 1 MB buffer to ensure hard disk compatibility
- Pinnacle record software for ISO9660, Red Book audio
- Records data, audio and video

#### 2 CD-ROM PLAYER

- Double speed player/multimedia compliant
- Reads standard CD-ROM titles
- Dust resistant design
- → Data rate 300 KB/Sec.
- → Seek Time 300 milliseconds
- → One-year limited warranty

#### 3 TAPE BACKUP REPLACEMENT

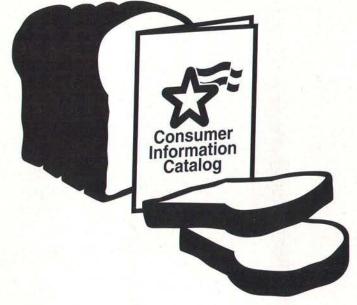
- Random access
- → Faster than tape
- → More reliable than tape (RCD media-100-year shelf life)
- → Bootable disk
- RCD media is readable in most CD-ROM drives
- → Pinnacle backup utility for Windows and Mac
- → Low cost media-\$29 per disk

All trademarks and Registered Trademarks of Their Respective Owners.

TO REACH THE PINNACLE CALL: 800-553-7070

714-789-3000 • FAX 714-789-3150





# The Greatest Thing Since Sliced Bread

No matter how you slice it, our free Consumer Information Catalog is great food for thought.

The Catalog dishes up more than 200 free and low-cost government booklets on subjects you can really sink your teeth into — such as staying healthy, eating right, finding a job, getting federal benefits, using credit, buying a home, helping your kids, taking care of your car, and much, much more.

To get your free copy, send your name and address to:

> **Consumer Information Center Department GT** Pueblo, Colorado 81009



A public service of this publication and the Consumer Information Center of the U.S. General Services Administration

Or did she just appropriate the image as so many overzealous (and budget- and deadline-conscious) graphics professionals do now as a matter of course?

As a photographer living and working in the wrapping-paper and greetingcard mecca of the western world (headquarters of Hallmark), I would be more than a bit hesitant to grab one of Hallmark's patterns for my own use. It just ain't worth it.

> Bud Simpson Kansas City, Missouri

Wrapping-paper designs-like any other artworkare indeed protected by copyright. But in this case, Breakey scanned a section of the wrapping paper that was taken directly from a fifteenth-century map, which is copyright-free due to its age. The copyright for the wrapping paper applies to the overall design (which includes a border of flags added by the designer) but not the map itself, which, according to Breakey, was unaltered from its original form. Had Breakey scanned and used the entire sheet of wrapping paper in her image, she would indeed have violated that copyright. But since she used only the section that's in the public domain, she committed no copyright infringement.-Ed.

#### Hidden Agenda

FTER TAKING A SECOND LOOK AT the review of Adobe Photoshop 3.0 (January 1995), I saw a familar but forgotten face on page 53-Vladimir Ilyich Lenin had been cropped, tiled, and pasted into the layout.

There could be several explanations for this: (1) Deke McClelland or someone on your staff is trying to subliminally influence my political leanings; (2) Deke admires communists and can't come to grips with the fact that they've melted down many statues of Lenin; or (3) you guys were just testing the perception of your audience.

Nice try, comrade.

Richard Tombelli Director of the People's Department of Design and Illustration Automation Graphics and Design East Lansing, Michigan

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), eWorld (Macworld), AppleLink (Macworld1), or via the Internet (letters@macworld.com). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld. m

#### SEE RED.









Design: Wheeler Design Photography: Kory Addis

#### AGFA. FOTOTUNE. RED.

There's RED and there's RED. We see redheads and red fire engines and we paint the town red. And while a rose may be a rose, a red is not always a red. In the world of electronic publishing, this is doubly true.

Scanners, monitors, and output devices define color in their own particular "languages" (called color spaces).

FotoTune is the solution. FotoTune, the Color Management System (CMS) from Agfa, takes those different color spaces and creates a "common language" called *ColorTag*. FotoTune insures color consistency throughout the workflow, from scanner to monitor to output device.

FotoTune. For all the ways of seeing red.

AGFA 🧆

Find out how FotoTune can help you. Call 1.800.685.4271, extension Tune.

# Introducing The Only Ink Jet Printer Worthy 0



Here's an ink jet printer of a different color. It's the amazing EPSON Stylus COLOR, and it offers dramatically better printing than all the other ink jet printers on the market—at a surprisingly affordable price. The EPSON Stylus COLOR is the world's only color ink jet to deliver output of 720x720 dots per inch.

Your Macintos

That's why MACWEEK said "With a resolution of 720 dpi, EPSON raises the bar for HP [and] Apple." So, for well under \$599, you'll print scanned images that seem photographic, charts and graphs that jump off the page, and razor sharp black and white text. You'll also get the same level of quality and dependability we've been building into EPSON printers for over 15 years. To see it all for yourself, call 1-800-BUY-EPSON, Ext. 3125 for the name of your nearest EPSON dealer. And experience the first ink jet worthy of your Macintosh.

#### **EPSON**



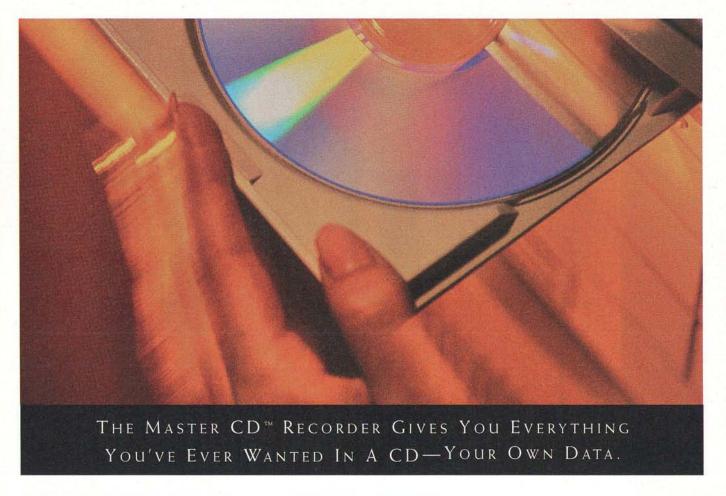
Well Under \$599. The Epson Stylus Color



# VOLUME 6 155 UE 6 APRILIMAY 1995

OME VISIT OUR NEW PETTING ZOO

720 dp jmming requires EPSON coatad paper 112.5c MSRP sheeti. Also prints 380 dpi on plaig paper EPSON and EPSON Stylus are registerer trademarks of SEIKO EPSON CORP. All other trademarks or registered trademarks are the properties of their respective holders. 1195 EPSON AMERICA, INC 20770 Madrona Ave. Orrance, CA 9050, 5rd Cealer referral or variant details, call 800-BUY-EPSON (800-283-3776). IN CANADA CALL 800-463-7766. FOR LATIN AMERICA CALL 305-265-0092.



#### All The Benefits Of Writable CD On Your Desktop.

Now you can create your own CDs and take full advantage of inexpensive, durable media and universal format acceptance. Thanks to Master CD, you can store or backup valuable data, publish and master timely information, transport enormous files of data, and even record your own audio CDs.

#### The Perfect Format To Store Or Transport Data.

The ability to store up to 650 MB of data (including audio and video) on a single disk opens a vast array of data archive and transport opportunities. Data retrieval is almost instantaneous and the durable qualities of CD media assure your data will be well preserved.

#### Master CD Has The Write Stuff.

The Master CD for Macintosh comes with Astarte's Toast CD-ROM Pro recording software (a \$1,595



THE WRITE STUFF.

\$1995

THE WRITE PRICE.

value) whose superior features encompass an intuitive Macintosh based interface, source speed testing and a "Don't Copy Free Space" option. In addition, Master CD offers a host of standard features including a 1.2 MB cache, multiple data format support, multi-session capabilities and drag-and-drop convenience. Now you can record from virtually any storage device on-the-fly eliminating the need for a dedicated hard drive.

#### Get 4X Recording Speed For Just \$4,995.

For the power user, the Master CD Pro<sup>TM</sup> with 4x recording speed is also available. Now for \$4,995 you can record a 650 MB CD in less than 20 minutes and enjoy all the benefits of Astarte's Toast CD-ROM Pro recording software.

#### Write Now.

For more information on high-yielding CDs or 800-650-DISK the name of your nearest MicroNet dealer call at 1-800-650-DISK.



MicroNet

All Trademarks, Registered Trademarks and Logos are of their respective holders

LATE-BREAKING

# NEWS MACBUILEtin

Apple Reveals 3-D Architecture To make 3-D modeling and rendering as mainstream and accessible as 2-D illustration, Apple has introduced QuickDraw 3D. QuickDraw 3D's interactive renderer will allow you to easily produce and manipulate 3-D imagery in real time. You will then be able to drag the image into a 2-D environment such as a page-layout or illustration program—where the image will be completely editable but will not lose its 3-D information. An extensible architecture for Power Macs (but not 680X0 systems), QuickDraw 3D should appear this summer, with a Windows version due six months later.

Macintosh dealers contacted by Macworld reported difficulty getting Power Mac 8100/100 and 8100/110 systems from Apple. ComputerWare, a chain in the San Francisco Bay Area, reported 225 back orders for 8100s. Apple said in early February that the 8100/100 was "inventory constrained" due to high demand, but predicted the situation would ease in a few weeks.

PowerBook Delays Users can expect PowerPC PowerBooks "in the summer time-frame," according to Brodie Keast, vice president of Apple's PowerBook division. This is a shift from Apple's previously stated "first half of 1995." The PowerPC 603, the chip originally slated for the PowerBooks, was unsatisfactory in a laptop design, so Apple decided to wait for a chip unofficially dubbed the 603+ (see "PowerBooks May Face Delay," *Power Mac News, Macworld*, September 1994). The 603+ recently surfaced as the PowerPC 603E (see following item).

Reacting in part to 680X0-emulation performance problems reported by Apple, IBM and Motorola have announced first silicon of the PowerPC 603E, a modified version of the PowerPC 603. The 603E runs at 100MHz and has memory caches twice the size of those on the PowerPC 603. The companies improved the chip's performance and its variety of bus speeds. Apple says that it will use the 603E in its first PowerPC PowerBooks. IBM and Motorola have also announced first silicon of the PowerPC 602, designed for portables and PDAs. Both chips should ship in the second half of 1995.

though the PowerPC 603 didn't work out for Power-Books, Apple will use the chip to create desktop systems that may offer the performance of a basic Power Mac 6100/60 (without cache RAM) at a much lower price, according to Carlos Montalvo, Apple product-line manager. Apple recently demonstrated a prototype of a 630-style Power Mac based on a 603 chip running at 75MHz. A desktop Mac can easily support external cache RAM, which the 603 requires for good performance but which consumed too much power and space in an earlier attempt at a 603-based PowerBook.

**OpenDoc Delay** Apple said in early February that the final version of OpenDoc for the Mac probably would not ship until fall, about five or six months after the original target of March or April. OpenDoc will be released as an extension to System 7.5 and will eventually be included as part of the Mac Operating System. Novell and IBM are simultaneously developing OpenDoc for Windows and OS/2, respectively.

said that CompuAdd Computer Corporation, a maker of PC systems in Austin, Texas, will build some of Power Computing's Power Mac clones (see "First Clones," in this issue). CompuAdd expects to ship the first Power Computing clones by April. Power Computing also announced a toll-free number: 800/999-7279. m

EDITED BY TOM MORAN

IN THIS ISSUE

p. 35 Apple's Game Machine p. 36 PCMCIA Modems p. 36 NuBus Woes Update

p. 37 Future Hard Drives p. 38 Digital Audio Roundup

p. 134 Plug-Ins for Illustrator p. 140 Intuit Does Accounting p. 152 ISDN Heats Up

#### Copland: Rebuilding the Mac OS

pple's next major revision to the Macintosh Operating System-codenamed Copland-will be a major reworking of the 11year-old OS that should require fewer system resources, crash less often, remove hardware dependencies (to speed development of the Apple-IBM converged PC standard), and give Mac programs a taste of true preemptive multitasking. Preemptive multitasking shields programs and OS components from each other and lets them reliably execute at the same time without interfering with each other. Apple's Copland engineering team recently discussed the Copland strategy with Macworld and detailed these and other salient features of the next Mac OS.

Most significant in the Copland effort appears to be Apple's commitment to make the Mac OS more efficient. By rewriting the core OS, called the kernel, Apple hopes to remove the inefficiencies introduced by years of squeezing new functions into the original OS. These inefficiencies explain why the Power Mac 8100/110 performs more slowly than a

7.5

90MHz Pentium PC in many cases, Apple engineers say (see "Power Mac vs. Pentium PC," Power Mac News, February 1995). A leaner, more efficient OS should let the Mac do more with the standard amount of RAM or require less RAM for users who run just one program at a time. It will also let software developers and designers of add-on peripherals get better perfor-

mance, since their products will not bog down under the Mac's current inefficiencies.

As part of that reworking of what Apple engineers call the OS's plumbing, Apple will introduce a hardware abstraction layer (HAL) to Copland, which will make it easier for Copland to work on Mac clones that use different controllers and other low-level hardware than Apple's Macs

use. A HAL acts as an interpreter between the OS and a computer's components, limiting developers' abilities to tie a function directly into a specific component. Use of low-level dependencies may let a developer implement a particular function more easily now, but they also make it more likely a product will not work correctly if that component is changed, either as the Mac

evolves or as Mac-clone makers use alternative components that don't act as the dependent product expects. Implementing the HAL is one reason Copland has been delayed until mid-1996, from the original target of late 1995.

Having a HAL and a rebuilt OS will also help Apple revise the Mac OS more quickly, helping it in the face of ongoing competition from Windows and OS/2. Apple is taking a multistage approach to revising the OS: one example is Copland's partial use of preemptive multitasking and protected memory. With a complete combination of techniques, the OS gives every program its own memoryaddress space and allocates mutual resources to prevent conflicts that might cause programs to fail (such as when faxing in the background while doing a database sort). In Copland's partial implementation of preemptive multitasking, the Mac OS will work in one protected space, and all programs will share another space. But programs can generate subprograms that run in their own protected spaces.

Having this limited form of preemptive multitasking will give Mac developers time to learn about how to use the technique for critical needs while Apple has the time to extend the technique so each program has its own space. When the successor to Copland, code-named Gershwin, ships in 1997 or 1998, it will support full preemptive multitasking. Apple expects that developers will have revised their programs during the Copland period, so as soon as Gershwin is released developers can take advantage of its full preemptive multitasking. This strategy is similar to the one Microsoft has pursued in its shift to preemptive multitasking between Windows 3.1 and Windows 95: Microsoft used the intermediate Windows for Workgroups and Windows NT to offer partial preemptive multitasking support, giving both developers

and Microsoft time to convert their programs and OS.

Another major change is writing most of the Mac OS as native Power Mac code. Today, less than half of the Mac OS is native, which causes slowdowns for many critical opera-

tions, particularly those involving input/output (I/O)—for example, disk writes, networking, and printing (see "Long Road to a Native OS," Power Mac News, in this issue). In fact, the entire I/O subsystem will be replaced, Apple says, to make it more efficient, more capable, and more stable. Apple expects 95 percent of Copland to be native code, although some Apple engineers say that is an optimistic estimate.

Apple also expects to open up its application programming interfaces (APIs) to make it easier for developers to take full advantage of the Mac's capabilities. Many developers now spend a great deal of engineering effort developing their own versions of features that the Mac already has but that developers can't access as they need to. Apple hopes this open API approach, coupled with further work on the Quick-Draw GX imaging/printing module and the PowerTalk communications module, will convince developers to take advantage of these Apple technologies.

In its Copland revision, Apple also expects to change the user interface by making it more customizable. Although the interface work is still in the conceptualization stage, the company expects to rely more on Apple Guide technology to automate tasks and lead users through choices.

Before Copland is released, Apple expects to deliver less ambitious updates to System 7. The first such update will be Marconi, which will be released with the first PCI-based Power Macs in June or July.—GALEN GRUMAN



#### Apple Licenses Game Player

BANDAI TO SELL PIPPIN CD-ROM PLATFORM

o, this isn't a misprint or an April Fools' story. Apple has announced that it has completed and will be licensing Pippin, a CD-ROM game platform similar to 3DO and Phillips' CD-I. According to Apple, Pippin is based on the Mac OS and uses a PowerPC 603 chip and a 4× CD-ROM drive; Pippin titles will run without modification on Macintosh systems, and Mac CD-ROM titles will require only minor tweaks to run on Pippin systems. The company also said that users would be able to play MPEG-compressed movies with a third-party expansion card to be announced.

In some ways this announcement seems like a good-news, bad-news sketch. The good news is that Pippin opens another avenue to push PowerPC and the Mac OS (however mutated) in front of consumers. The bad news is that the bloody, vicious console game arena is characterized by paper-thin profit margins and a fickle audience. The good news is that the industry is in transition to a more powerful class of machine, creating opportunities for new companies to grab market share. The bad news is that many end-users may wait for a clear winner to emerge before they buy into a new platform.

The first Pippin licensee is Bandai, the Japanese toy continues

## In Brief

#### 1.5 Million HP Ink-Jets Need Fixing

Hewlett-Packard recently began shipping a free kit to fix paperhandling problems in the DeskJet 550C, 560C, 520, and 510, and in the DeskWriter 520 and 510. Affected models have a serial number starting with the sequence US3 through the sequence US43. Users place the kit's cleaning pad in the paper tray, insert a provided disk, and run a program that causes the rubber paper-pickup roller to rub against the cleaning pad for 20 minutes. Once or twice should be sufficient for the life of the printer. Registered users should receive the kit without requesting it; users who have not registered should call 800/656-2324.

#### **Digital Video System**

Radius has introduced its Radius Edit 1.0 nonlinear video-editing software for professional TV, multimedia, and video producers. Radius Edit will be bundled with the company's \$15,845 VideoVision Telecast videoediting system, which includes a video-editing card and videoout breakout box. The software supports dual monitors (one Mac monitor, one NTSC preview monitor), QuickTime 2.0, builtin titling (including support for QuickDraw GX font effects), high-speed previews, built-in transitions, multiple key frames, and the ability to save effects as styles that can be reused in other projects. 408/955-1556.

#### Converging Communications

CommuniGate is a \$299 software platform that supports modules for applications such as fax, voice mail, paging, E-mail, file transfer, and fax-back. Due in March, it includes a server application, a front-end application, fax module, and fax print driver. Through June, Stalker is offering CommuniGate with fax for \$29 and the original disks from any fax program for the Mac. A voice-mail module costs \$99, 415/927-1026.

giant behind the Mighty Morphin Power Rangers. Bandai has said that its resulting Power Play machine will hit the stores at around \$500 in time for the 1995 holiday season. Apple Computer, 408/ 996-1010.—CAMERON CROTTY

## **Digital Video**

**TARGA 2000** AND MEDIA 100



Truevision and Data Translation, two giants the video arena, are intro-

ducing new versions of their digital-video products that will give users improved quality. Truevision, a division of RasterOps, just announced that the Targa 2000, a highend video-capture card popular in the PC market, will be released in a Macintosh version with the exact same name. The stats on the Targa 2000 for the Mac are impressive: the card offers fullscreen, full-motion video recording from NTSC and PAL composite or S-Video sources (with full CCIR-601 compatibility), including fully synced 16-bit stereo audio. Output can be genlocked to an external source, and the board ships with a 20MB RAM buffer. An AT&T 3210 DSP (the same chip as in the 840AV) handles the audio, and the JPEG compression is via a daughtercard that could be swapped for other compression cards in the future.

The Targa 2000 should ship in March at a suggested retail price of \$5599. In April, the company plans to offer a bundle of the Targa 2000 with a component option for Betacam SP and other highend video formats. That bundle should cost an estimated \$7999. Truevision said it is working on a PCI-bus version of the Targa 2000 that will work with the next generation of Power Macs.

Also, Data Translation announced version 2.0 of its Media 100 nonlinear digitalvideo system. The new version, now Power Mac-native and therefore faster, will sell for \$8995, a 25 percent drop in price from the previous version. New features include All-In-One Mastering, a system that uses low-res proxies while editing and then automatically redigitizes high-res versions for final output; support for QuickTime 2.0; fieldinterpolated motion effects; genlocked output; and better output quality. The new Media 100 should be shipping by the time you read this. RasterOps/Truevision, 408/562-4200; Data Translation, 508/ 481-3700.-MATTHEW LEEDS WITH JIM FEELEY

## **Modems**

PCMCIA COMES TO **POWERBOOKS** 

ike Alice eating those magical morphin' mushrooms Wonderland, in PowerBook modems have grown . . . and shrunk; Angia Communications, Motorola, Practical Peripherals, and TDK are among the latest manufacturers to announce PCMCIA fax modems that

work with the PowerBook 500 PCMCIA adapter.

All these mohave standard 14.4-Kbps data/fax feature-set down cold: V.32 speed protocol, V.32bis compression, V.42 error correction, V.17 fax protocol, and Group fax support. Practical Peripherals is selling just

such a basic model-its Mac-Class MC144T2 retails for \$229. Angia sweetens the pot with V.34 (28.8-Kbps) support built into its latest SafeJack model. The SafeJack (\$479) also comes with an adapter with two RJ-11 jacks so you can use the same phone line for voice and data, without plugging and

unplugging.

Adding cellular capability is a popular approach; just add the appropriate cable and a data-capable cellular phone, and you're ready to be a roaming data warrior. Motorola's Power model (14.4-Kbps data/fax, \$339) is cellular-ready, as is TDK's DF2814APB model. You have to pay TDK \$79 for the cable to connect the card and the phone, while Motorola's cable comes free; on the other hand, the TDK fax modem can connect to several brands



PCMCIA-compatible fax modems from Practical Peripherals (left), Motorola (right), and Angia (bottom).

of cell phone, while Motorola's is limited to Motorola phones. TDK's offering also sports a high-speed V.34 data modem (14.4-Kbps fax, \$499). Angia Communications said that it also has a cellular-capable model available.

Given reports of Apple's plans to build PCMCIA slots directly into future Power-Books, Macintosh users can expect to become more familiar with these credit card-size peripherals. Angia Communications, 801/371-0488; Motorola Transmission Products Division, 205/430-8000; Practical Peripherals, 805/ 497-4774; TDK, 916/478-8421.—CAMERON CROTTY

## **NuBus Woes**

LATEST 8100 MODELS ADDRESS MOST CONCERNS

mesponding to customer confusion over what, if any, performance problems owners of NuBus cards will experience with the latest Power Macs, Apple has released more details about the performance issues that may affect some card owners in the first set of 7100s and 8100s and in the current models. (See "Apple Won't Fix NuBus Flaws," News, March 1995.)

 Both new 8100 models-the 8100/100 and 8100/ 110-have new ROMs and a new NuBus controller chip, called the Bart 21. The new chip provides superslot ad-

#### THE AMCOEX INDEX OF USED MACINTOSH PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change -\$75	
PowerBook 100/4MB/20MB	\$500		
PowerBook 140/4MB/40MB	\$700	-\$50	
PowerBook 180/4MB/80MB	\$1550	-\$50	
PowerBook Duo 230/4MB/80MB	\$800	-\$25	
Mac Classic/2MB/40MB	\$325	+\$25	
Mac SE/30/2MB/40MB	\$525	+\$25	
Mac LC II/4MB/40MB	\$450	-\$50	
Mac IIsi/3MB/40MB	\$450	-\$50	
Mac IIci/4MB/80MB	\$650	-\$25	
Mac IIfx/4MB/80MB	\$800	-\$50	
Centris 650/8MB/230MB	\$1375	-\$25	
Quadra 900/8MB/160MB	\$2000	-\$100	

Index provided by the American Computer Exchange of Atlanta (800/786-0717). It reflects sales during week of January 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

dressing, which lets these Macs support more than the three built-in NuBus slots. To add NuBus slots, you need an Expanse NB external chassis from Second Wave (512/329-9283).

• In the Power Mac 7100/66, some users noticed slower NuBus performance than on a Quadra 840AV. The cause was the way the 7100/66's NuBus controller handles asynchronous masterburst reads from main system memory. Apple says that few cards read data this way, so most cards won't show a slowdown. In fact, the only card Apple is aware of with the problem is Radius's Video-Vision Studio, which uses master-burst reads for optimal performance (see "Video Hits Roadblocks," Power Mac News, September 1994). Other methods for reading and writing data had no flaws, the company says. Furthermore, Apple says that only the 7100/66 is affected—not the 7100/80, since its synchronous bus does not use asynchronous master-burst reads. Radius confirms that the VideoVision Studio 2.0 works well in the 7100/80. The 8100/100 and 8100/110 have asynchronous buses, but the Bart 21 chip makes them work correctly with the Video-Vision Studio, Apple says.

• An Apple product manager had indicated before the new 8100s shipped that because the 8100/100's 33.3MHz system bus speed (or the 8100/110's 36.7MHz speed) was not an even multiple of NuBus's 10MHz bus speed, some cards might have a slowdown relative to the 8100/80. However, Apple engineers have not seen any such slowdown and do not now believe any will occur.

• Many NuBus cards, particularly video-display cards, required new ROMs to work with the Power Macs. But major developers such as Radius, SuperMac Technology, and RasterOps have been offering those upgrades since last spring for many of their products.—GALEN GRUMAN

#### **Driving Hard**

NEW TECHNOLOGIES STOKE MARKET

torage purchasers expect prices to drop while capacities and speeds skyrocket. To stay on the upward curve of speed and size, hard drive vendors are announcing products based on relatively new technologies like magnetoresistive (MR) heads, PRML (Partial Response Maximum Likelihood), and new SCSI protocols. These drives are OEM units and won't ship to the general public until mid- to late 1995.

Quantum has announced that it will lead off 1995 with two 3.5-inch drives with MR heads: the SCSI-2 Fast and Wide 1.1GB Capella VP31110 and 2.2GB VP32210. MR read heads pack bits more



The 3.5-inch Quantum Capella VP32210 stores 2.2GB by using MR heads to pack data closer together on the disk.

tightly together on the disk than do the less-expensive thin-film inductive heads currently in use. IBM has also announced new drives with MR heads, the SCSI-2 Fast and Wide 540MB (singleplatter) and 1.08GB (dualplatter) Deskstar XP drives.

In addition to physically reading data that's more densely packed, the drive must be able to decipher it. PRML read channels help sort out the interference between adjacent data bits and allow for more efficient data storage. Nearly all hard drive vendors are touting the advantages of

PRML, but so far only IBM (several models) and Quantum (Empire 2100 and 1400) have introduced drives that use it.

While MR heads and PRML will increase storage capacities, companies are also working to improve data throughput by implementing one of the four parts of the ANSI SCSI-3 specification: Ultra SCSI, Fiber Channel Arbitrated Loop (FC-AL), Serial Storage Architecture, and P1394 (FireWire).

The least exotic of the four protocols, Ultra SCSI provides for data-transfer rates of up to 20 MBps with standard 50-pin connectors and 40 MBps with the 68-pin or 80-pin connectors currently used on Fast and Wide drives. While there are no hardware changes to implement, Ultra SCSI limits the total length of a chain's

cabling to 1.5 meters (about 4.5 feet). Seagate, Quantum, and Hewlett-Packard have all announced that they will support Ultra SCSI; Quantum has further announced that in the first quarter of 1995 it will produce Ultra SCSI versions of its 2.1GB and 4.3GB Grand Prix drives.

A ways further along the technology spectrum, the FC-AL technology

promises data-transfer rates in the 100-MBps range, and Seagate's new 3.5-inch, 4.3GB Barracuda 4FC will come with an FC-AL interface built in. However, users are unlikely to see products with this kind of performance until early 1996, as FC-AL requires costly special physical interfaces on both the drive enclosure and the host machine. Quantum and Hewlett-Packard have also announced that they will support FC-AL.

The third member of the SCSI-3 family, Serial Storage Architecture (SSA), is backed continues

## In Brief

#### Stacking Up with RAID

Microtech unveiled its Power-Raid line of RAID Level 0 and Level 1 disk arrays using its new MicroLynx stackable storage units. Due in early February, systems will come in 2GB (\$4186) to 8GB, Wide (\$9477) arrays. Fast and Wide arrays include Atto Technology's SiliconExpress IV SCSI adapter board and ExpressStripe or ExpressMirror software.

The MicroLynx cases give Microtech drives a stacking form factor, using special short SCSI and power cables to make setup simple. Microtech also sells single drives and tape units in the MicroLynx units. 203/468-6223.

#### **Personal Button Bars**

Billed as a "personal buttonbased interface," Westcode Software's \$130 OneClick combines the convenience of button bars with the power of a proprietary scripting language. Buttons can be created for a variety of uses for any Macintosh software application, including the Finder. 619/487-9200.

#### Newton with a Radio

Motorola has introduced Marco, the latest addition to the Newton ranks. Inside a matte black, paperback-book-size, folding case, the Marco is nearly identical to Apple's Message-Pad 110. It's fully compatible with all Newton applications and most peripherals; it has a standard infrared beaming port, an AppleTalk-compatible serial port, and a PCMCIA (PC Card) Type 2 slot; and it uses a nickelcadmium battery that provides eight hours of average use. The big difference is that Motorola has added a two-way radio modem for use with RadioMail and the Ardis network. Using bundled applications, users can send and receive Internet mail, send faxes, and receive stock quotes and news bulletins. Motorola expects the Marco to retail for \$900 to \$1400. 800/947-3537.

by IBM with its newly announced 3.5-inch, 8.7GB Ultrastar2 XP and several previously announced drives in the Ultrastar line. SSA technology promises data-transfer speeds as high as 80 MBps with less expensive interfaces than FC-AL.

Apple and Maxtor have both announced support for P1394—for more information see "Will FireWire Replace SCSI?" (News, March 1994). But when it comes to actual products, FireWire appears to be trailing the rest of the pack. A Maxtor spokesperson said that finished products based on FireWire would not appear until late 1995 or early 1996. -CAMERON CROTTY

## Macs

AUDIO ROUNDUP

ost people think of Macs as graphics machines, but they're a force in the audio world, too. At last November's Audio Engineer Society convention in San Francisco, audio professionals listened to the latest Macbased audio tools.

A pioneer of Mac digital audio, Digidesign (415/688-0600), introduced the Pro Tools III, the newest in its series of high-end audio workstations. A combination of hardware and software, the Pro Tools III system enables NuBus-equipped Macs to record, play, and digitally process up to 16 tracks of CDquality audio. Pro Tools III lists for \$7990. An expansion kit adds an additional 16 tracks. It lists for \$4995. Expansion kits can be combined for a total of 48 tracks.

Waves (615/588-9307) released Pro Tools III-compatible updates of its highly regarded sound processing plug-in modules. These include the \$600 Q10 Parametric Equalizer, which boosts or attenuates certain frequencies to enhance a recording, and



Digital Expressions' SoftSplice digital-audio editor (bottom) supports 4-track recording and playback.

the \$800 L1 Ultramaximizer, which processes recordings to provide the highest sound quality at a variety of sampling resolutions (it's popular among multimedia producers). Waves also shipped its new, \$700 C1 Compressor/ Gate, a plug-in that adjusts the dynamics of a recording to add punch and improve sound quality. And the company introduced WaveShell, a \$100 program that lets you use Waves plug-ins independent of Digidesign's recording software. WaveShell-and all three Waves plug-ins-work with all Digidesign digitalsignal processing (DSP) hardware, from the Audiomedia II card to the new Pro Tools III system.

Waves said it is currently creating versions of all three processing tools that will plug into Adobe Premiere-great news for video and multimedia producers. Better still, the planned Premiere plugins will not require Digidesign DSP hardware when run on Quadra 660AV and 840AV machines.

The Adobe Premiere audio plug-in format will also be supported by a future version of the \$399 Deck II multitrack recording program by OSC (415/252-0460; see Reviews, Macworld, June 1994). The new version will also provide built-in equalization and other digital effects and is slated to ship in the first quarter of 1995. In the meantime, OSC has shipped Deck II 2.2, which runs native on Power

Macs and supports up to 12 tracks on a Power Mac 8100, 10 tracks on a 7100, and 8 on a 6100. (The Quadra 840AV is limited to 8 tracks.) The upgrade is free to Deck II 2.1 owners and costs \$50 for Deck II 2.0 owners.

Digital Expressions (206/389-9895) introduced a new version of its \$1895 SoftSplice digitalaudio editor, a dictionary-size box

containing DSP hardware that enables 4-track digital recording and playback. While other firms' DSP hardware installs in a NuBus slot, the SoftSplice connects to a Mac's SCSI port-it even works with PowerBooks. One catch: the base unit contains only digital input and output; if you need to record an analog signal (such as that coming from a microphone) you must connect the SoftSplice to a digital audiotape recorder or to Digital Expressions' \$995 digital-to-analog converter. The new version's included software provides enhanced editing tools and better support for SMPTE time code. -JIM HEID

#### **BUGS & TURKEYS**

Apple's QuickTime 2.0 and Sound Manager 3.0 have trouble playing movies and sounds smoothly and consistently. Apple says Multimedia Tuner 2.0 fixes the problems and is available through ftp.apple.com (also accessible through America Online and GEnie).

Macromedia's Director 4.0 won't recognize System 7.5 Scrapbook files. Macromedia says Apple changed the Scrapbook's file format; Macromedia plans to fix the problem in the next scheduled release. Those who want an alternative tool to move images and data between applications can use Scrapbook replacements like Olduvai's MultiClip Pro, Now Scrapbook, or the Scrap-It shareware program.

You'd better have all linked Excel 5.0 spreadsheets open when you update the links, or you could end up with incorrect data. Microsoft says it happens only when the source spreadsheet is closed and has certain formatting characteristics: either the linked cell is preceded by multiple blank cells or is preceded by two cells containing integers plus a blank cell. Microsoft says Excel 5.0a, slated for early 1995 release, will fix the problem.

Claris Organizer 1.0 doesn't support Apple events, so forget AppleScripts or automatic dialing with devices such as Sophisticated Circuits' Desktop Dialer. Apple subsidiary Claris says Organizer may support the parent company's technology in a future release.

Want to use QuickDraw GX with your Color StyleWriter Pro, Express Modem, or GeoPort? Sorry-Apple says drivers for those products won't be available until early 1995. We guess the 18-month development cycle for GX didn't leave Apple enough time to wrap up loose ends, such as support for their own products.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See How to Contact Macworld.



## Color is color, until you see the fine print.

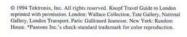
Then you'll know it's Phaser Color. Eyeball it up close. Check out the spotless color of the new Phaser<sup>™</sup> 440, the newest continuous tone color printer from Tektronix. It dots i's and crosses t's with the precision of TekColor<sup>™</sup> Photofine<sup>™</sup> and true Level 2 Adobe® PostScript. Stunning overhead transparencies. Matchless pre-film proofs. All printed to Pantone®® Color perfection. And it's fast, processing

images at RISC-speed, it snaps out 8½" x 11" full bleed prints.

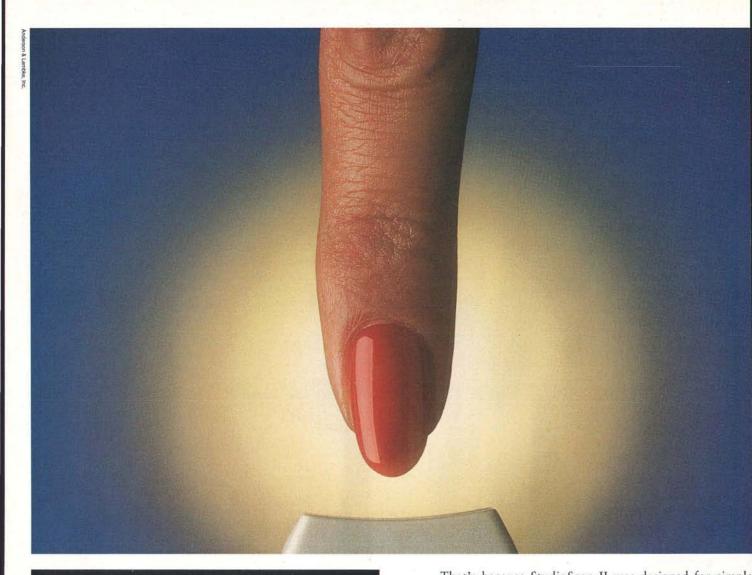
PCs, Macs, workstations, networks: it supports them all—simultaneously. And it's from Tektronix, the Fortune 500 leader, where quality in workgroup color printers starts at only \$2,995 and persists to the last detail.



Free output sample, call 800/835-6100, Ext. 1007.







WHAT OUR ENGINEERS HAD IN MIND WHEN WORKING ON OUR NEWEST SCANNER.



Introducing the Agfa StudioScan II.

Push a button, make a scan. Is it

really that simple? With the new Agfa StudioScan II, it can be.

That's because StudioScan II was designed for simple operation. Two levels of scanning software are built in - easy-

to-use Agfa FotoSnap and comprehensive Agfa FotoLook. Plus, our exclusive, 42-page Introduction to Digital Scanning will guide you through the scanning process.



What's more, every StudioScan II comes complete with Agfa FotoTune LE color management software and our IT-8 reference target, along with Adobe PhotoShop™ LE and OmniPage Direct™ OCR software. All in a 400 x 800 ppi, 30-bit, one-pass scanner. And all for about \$1,000.

So if you want an easy way to bring a scanner into your office, all it takes is the new StudioScan II. And your finger. Call 1-800-685-4271, ext. 2743 to find out

more information on Agfa's new scanners.

The complete picture

AGFA and the Agfa rhombus are registered trademarks. Photoshop is a trademark of Adobe Systems Incorporated, which may be registered in some jurisdictions. Omnipage Direct is a trademark of Caere Corporation.

## Power Mac News

#### Long Road to a Native OS

MARCONI, COPLAND TO ADD NATIVE CODE

ince System 7.5 is Power-PC-native, you may think your Mac can now fully exploit the potential of the Power-PC. But System 7.5 still contains more 680X0 code than PowerPC code, the reason for slowed performance in some areas, and it will be several years before Apple has a version of its system software that is mostly native.

Many important portions of System 7.1.2 and 7.5-particularly QuickDraw-are written in native code. Still, in the core portions of System 7.1.2, just 17 percent (39 of the 235 processes) are native, while in the Toolbox supplemental processes, just 23 percent (191 out of 821) are native. System 7.5 has just slightly more native code than 7.1.2. Apple says that most software relies mainly on the parts of the Mac OS that are already native-but Apple refuses to estimate what percentage the time spent in native parts of the operating system might actually be.

Although 680X0 code does not run optimally on a Power Mac, frequent switching back and forth between emulation and native code runs even slower. As a result, in System 7.5 Apple actually changed a few native-code portions of System 7.1.2 back to 680X0 code to reduce the switching penalty.

How much faster would a Power Mac run if the entire System 7.5 were native code? No one knows for sure; system-software developers estimate anywhere from a 25 percent improvement for CPU-intensive applications to a 50 percent or greater improvement for disk-intensive applications (since much of the I/O processes in System 7 are 680X0 code).

Even if you use native Power Mac software, your system may be slowed down by 680X0 components added to the Mac OS in the form of extensions and control panels. Both the freeware program PowerPeek (available on the online service ZiffNet/Mac) and the \$79.95 Conflict Catcher II 2.1 program (from

Catcher II 2.1 program (from use a 604

Casady & Greene, 408/484-9228) show which extensions and control panels may be slowing native applications by replacing native code with 680X0 code. But again, not all such situations will appreciably slow the Mac.

Unmasking Marconi
Eventually these issues will go
away as Apple moves toward
an all-native operating system.
Marconi, the code name for
the System 7 update scheduled
for a mid-1995 release with
the first PCI-based Power
Macs, contains about onethird native code. Marconi
will have a native-code device

manager, which will handle all the system hardware outside the CPU and RAM. It will also have an optimized emulator for 680X0 code on the PowerPC that will convert blocks of 680X0 code into native form and save the blocks in RAM for reuse. (The System 7.5 emulator deals with 680X0 code only one instruction at a time and does not save any work.) This improved emulator may only run on Macs using the PowerPC 603 and 604 CPUs-not on the earlier 601 CPUs. (Only one of the first PCI Power Macs is likely to use a 604, but all PowerPC

PowerBooks are likely to use a 603.)

Connectix plans to offer similar emulation improvements for current Power Macs in an as-yet-unnamed program scheduled to be released in February 1995.

Composing Copland Apple is expecting Copland, the code name for the major revision

of the Mac OS, to be 95 percent native code, according to the company. However, some Apple programmers privately say that the native-code portion will fall far short of 95 percent but should still be more than 50 percent. Copland will have native code for such key areas as the File Manager, which creates and reads disk files.

Because of many changes in its design and because of native code, Copland could run twice as fast as System 7.5 for some applications, Apple says, although such early estimates are tenuous at best. Both versions are expected to provide important new features, including preemptive multitasking, which is long overdue for the Mac. But the native PowerPC version should go a long way toward realizing the potential of the Power Mac already on your desk.—CARY LU

#### **Power Watch**

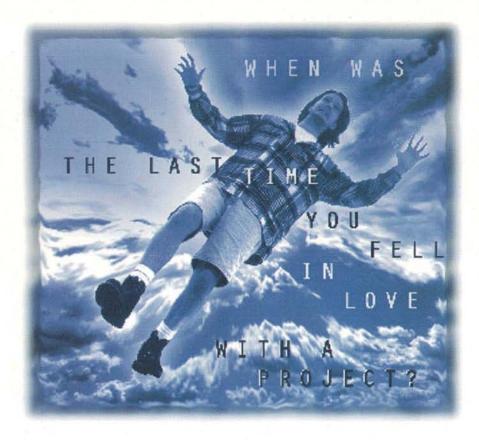
THE LATEST ON PRODUCTS FOR THE POWER MACS

- atawatch Corporation has shipped Virex 5.5 with SpeedScan, a \$100 antivirus utility. Upgrades cost \$25. 508/988-9700.
- DayStar Digital has begun shipping its Turbo 601 accelerator card for the IIci. The card, which requires System 7.5, includes a 66MHz PowerPC 601 CPU and should provide equivalent performance to that of a Power Mac 6100/60. The company's estimated price is \$1199, but DayStar says it will lower the price once the initial demand has been satisfied. 404/967-2077.
- Design Science has announced MathType 3.1, a \$199 equation-editing add-in for Microsoft Word, Word-Perfect, MacWrite Pro, Full-Write, and Nisus Writer. Upgrades from version 3.0 cost \$29.95. 310/433-0685.

-GALEN GRUMAN



Datawatch's Virex 5.5 uses native Power Mac code to speed virus scans.



## INTRODUCING INDUSTRIAL - STRENGTH VIDEO

[FOR UNDER \$1000]

If you haven't had a truly great time with a project lately, it's time you discovered the true potential of your AV Macintosh.

With Radius SpigotPower AV you'll fall in love with full-screen, full-motion video on your Mac.

It's perfect for industrial videos, like in-house and sales presentations, training tapes, and every multimedia application you can think of. And you don't need a disk array, because everything runs off the built-in AV hard disk on your system.

So start pouring real video into everything you do. Discover the full potential of your AV system with SpigotPower AV. Call Radius at 1-800-227-2795 for more information.

Get SpigotPowerAV. Because the tools you use matter.

SPIGOTPOWER AV. FULL-MOTION, FULL-SCREEN VIDEO FOR AV MACS



## Macworld Online

#### by Macworld Online Staff

Have you ever wished that you could simply and quickly search back issues of *Macworld?* Are you frustrated with shareware libraries that offer poor-quality files? Would you like to post a Macintosh-related question and get an answer (or ten) within 24 hours? How about a chance to exchange views with some of the major writers, analysts, and developers in the industry?

Macworld Online offers all this and more. In addition to electronic access to *Macworld*'s excellent print editorial, look for supplemental sidebars, bibliographies, and additional Macworld Lab results.

Steve Costa, founder and former executive director of BMUG, oversees our message boards and bustling shareware libraries. On Tuesday evenings we host live events that feature editors, authors, developers, artists, and industry pundits (see the calendar at right). Also, we invite developers to post product demos and software upgrades.

And this is just the beginning. Today you will find us on AOL and eWorld (keyword Macworld on either service). Soon we'll be launching our own Internet site, complete with Gopher, FTP, and World Wide Web capabilities. Join us online!

#### **Internet Update**

In our quest to design the best possible Internet server, we've been combing through hundreds of Web sites. We discovered that while many do an excellent job of linking content in a coherent and useful manner, few acknowledge online realities (that is, snaillike data-transmission speeds) when integrating graphics.

WEB graphics must be presented efficiently in the first place, and be worth the wait in the second place. Not surprisingly, it is the art community that has evolved some of the best online graphic presentations. Here are the universal resource locator (URL) addresses for a few of our favorites.

For a sweeping survey of classic art, a nicely paced tour of the Louvre resides at http://mistral.enst.fr/~pioch/louvre.
The more narrowly focused D. G. Rossetti HyperMedia Archive elegantly melds digi-

tized images of the pre-Raphaelite's paintings with his poetry and prose at http://jefferson.village.virginia.edu/ros setti/rossetti.html.

Another graphically rich site—ArtServe, at http://rubens.anu.edu.au/—is the brainchild of Michael Greenhalgh of the Australian National University, which houses nearly 3000 prints from the fifteenth to the nineteenth centuries.

For a modern fix, the Andy Warhol Museum Home Page resides at http://www. antaire.com/warhol. And a more commercial site, Kaleidospace, offers artists the chance to sell their work online at http://kspace.com/.

#### Shareware Picks

Recognizing that not all shareware is created equal, Macworld Online culls the shareware universe for files that are truly useful, robust, and entertaining. Here are a few of this month's favorites, along with their approximate sizes and shareware fees.

The menu-based launcher Apollo 1.12 by Jeremy Roussak swiftly opens applications, documents, control panels, desk accessories, and Finder folders (331K; \$30).

High Risk Ventures' Cyclone 1.2.1 evokes the mood and excitement of the classic arcade game Star Castle, complete with a wraparound screen, rotating shield rings, and a nasty plasma cannon (950K; \$10).

Those who persist in hunting and pecking might well find that Typing Tutor JR2.1.1 from W. Rogers is just the ticket for improving keyboard speed and accuracy (102K; \$9.95). Like a magic briefcase, David Darby's DeskMates 1.3.3 opens to reveal a notebook, clock, stopwatch, calculator, calendar, scheduler, and address book (338K; \$20).

Macworld Online sez: Support a starving code-artist —pay for your shareware!

#### LIVE-EVENTS CALENDAR

Each Tuesday evening, Macworld sponsors live events that bring the industry's leading pundits and developers to your desktop. We invite you to join us for lively repartee and behind-the-scenes gossip. Bring questions, critiques, and your own experiences. All times are Pacific standard time.

#### Macworld Lab Unveiled February 28, 6 p.m. AOL

Join the Macworld Lab staff for an inside look at the rigors and travails that accompany the testing of Mac-related products. Offer kudos, gripes, feedback, and suggestions.

#### Troubleshooting with Pogue March 7, 6 p.m. AOL

Macworld's Desktop Critic author, David Pogue, invites you to pose your trickiest Macintosh-related questions in this troubleshooting free-for-all.

#### Ask Cary Lu March 7, 7:30 p.m. eWorld

Contributing editor Cary Lu brings considerable expertise to his question-and-answer fest. PowerBooks are his *Macworld* specialty, but at this event any Macintosh topic is fair game.

#### An Evening with the Residents March 14, 6 p.m. AOL

Tonight's guests, the Residents, always perform incognito, but those interested in learning more about the Macintosh-based artistry behind CD-ROMs such as Freakshow and Gingerbread Man ought to tune in.

#### Security on the Net March 21, 6 p.m. AOL

Contributing editor Steven Levy offers insights into the various security dilemmas plaguing the online world—privacy, piracy, and cybermoney.

#### Tom Knows Best

March 21, 7:30 p.m. eWorld
Macworld contributing editor Tom
Negrino knows his way around a
Macintosh, and he's more than
willing to share his knowledge with
those who attend this event.

#### Future Macs March 28, 6 p.m. AOL

Macworld executive editor Galen Gruman discusses upcoming features to be found in Macintosh operating systems. Come prepared with questions, wish lists, and advice for Apple.

#### REACHING MACWORLD ONLINE

America Online and eWorld Keyword is Macworld There's the one

where you're suddenly standing onstage

at the senior prom wearing only really

big underwear and a fez.

nd everyone is laughing hysterically,

including Mr. Dimnitz

your guidance counselor.

there's

our computer

hard drive fries 30

presentation, and

very



HEY, WE CAN'T HELP YOU AVOID NIGHTMARES AT NIGHT, BUT WE CAN HELP WITH THE DAYTIME ONES. CHECK OUT RETROSPECT. IT AUTOMATICALLY BACKS UP ALL FILES ON YOUR MACINTOSH. WHETHER IT'S POWER LOSS, THEFT, FIRE, OR DOOFYNESS, IT'LL SAVE YOU HOURS OF RECREATING AND WAITING IN UNEMPLOYMENT LINES. RESTORES ARE QUICK AND COMPLETE. IT BACKS UP DATA TO ANY STORAGE DEVICE, AND HAS OPTIONAL COMPRESSION AND ENCRYPTION. PLUS, JUST ADD A REMOTE 10-PACK AND YOU HAVE NETWORK CAPABILITY. WAKE UP. CALL 1-800-225-4880 FOR MORE INFORMATION.



Circle 26 on reader service card

# New Products

THE LATEST MACINTOSH RELEASES

#### by Cameron Crotty

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY MACWORLD. UNLESS OTHERWISE STATED, ALL PRICES ARE SUGGESTED RETAIL AND THE MINIMUM REQUIRE-MENTS FOR OPERATION ARE A MAC PLUS WITH 1MB OF RAM, RUNNING SYSTEM 6. A SIGNIFIES THAT A NATIVE POWER MAC VERSION OF THE PRODUCT IS AVAILABLE, ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDE-PENDENTLY VERIFIED BY MACWORLD. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

#### HARDWARE

#### 2082DC

This 20-inch color monitor features a 1600-by-1280-pixel maximum resolution, a vertical refresh rate up to 90Hz (75Hz at most common resolutions), a 0.28mm dot pitch, and adjustable color intensity. The 2082DC is Energy Star-compliant and meets the Swedish MPR II emissions guidelines. A required adapter comes separately but is free from the company. \$1399 estimated street price. Optiquest, 909/468-3750, 800/843-6784; fax 909/468-3770.



2082DC

#### 4000TC and 4500DC

It may not be in the same league as the Mac-versus-PC holy war, but with these 17-inch color monitors Optiquest has both sides of the Trinitron-versus-shadow-mask debate covered. The 4000TC is a Trinitron display with a 0.25mm aperture pitch, a maximum resolution of 1280 by 1024 pixels, and a vertical refresh rate up to 90Hz (75Hz at most common resolutions). The 4500DC is a 17-inch color monitor with a 0.28mm dot pitch, a 1600-by-1280-pixel maximum dot pitch, a 1600-by-1280-pixel maximum dot pitch.

mum resolution, and a vertical refresh rate up to 100Hz (75Hz at most common resolutions). Both monitors are Energy Star-compliant and meet the Swedish MPR II guidelines. 4000TC \$849 estimated street price; 4500DC \$795 estimated street price. Optiquest, 909/468-3750, 800/843-6784; fax 909/468-3770.

#### CA0913DS

Sometimes you need full resolution in a small space. This 9-inch, multiresolution color monitor displays up to 1024 by 768 pixels and features a dot pitch of 0.28mm and a maximum vertical refresh rate of 100Hz. The display is Energy Star-compliant and meets the Swedish MPR II emissions guidelines. \$529. Smile International, 714/546-0336; fax 714/546-03315

#### CA2011 and CA2111

For an expanded perspective on your work, you could take a four-month sabbatical-or you might just try a larger monitor. The CA2011 is a 20-inch multiresolution color monitor with a maximum resolution of 1280 by 1024 pixels, a vertical refresh rate up to 120Hz (75Hz at 1154 by 768 pixels), and a 0.31mm dot pitch. The 21-inch CA2111 has a maximum resolution of 1600 by 1280 pixels, a vertical refresh rate up to 120Hz (75Hz at 1154 by 768 pixels), and a 0.28mm dot pitch. Both models have digital LCD controls, 9 factory presets, and memory for 27 user-programmable settings. Both are Energy Star-compliant and meet the Swedish MPR II guidelines. CA2011 \$1099; CA2111 \$1699. Smile International, 714/546-0336; fax 714/546-0315.

#### CT-21B and CF-17A

The larger of these two multiscanning color monitors is the CT-21B, a 21-inch DiamondTron display with a 0.30mm aperture pitch and a 1600-by-1200pixel maximum resolution. The CT-21B has 12 digital controls for image adjustment, including color temperature; users can also plug into the display's ADB port and control the monitor with the included software. The CF-17A is a 17-inch display with a 0.28mm dot pitch, 1280-by-1024-pixel maximum resolution, and a vertical refresh rate up to 90Hz. The CF-17A also has digital controls. Both monitors are Energy Star-compliant and meet the Swedish MPR II emissions guidelines. CT-21B \$2495; CF-17A \$899. Ikegami Electronics USA, 201/368-9171, 800/368-9171; fax 201/368-1305.

#### **DiskStor Drives and Arrays**

Conner Peripherals has announced a line of high-capacity internal and external drives and a set of two-drive arrays based on those drives. The single drives have SCSI-2 Fast interfaces and come in capacities of 1GB (9ms average access time, 7-MBps sustained data-transfer rate); 2GB (8.5ms average access time, 11-MBps sustained data-transfer rate); and 4GB (8.5ms average access time, 11-MBps sustained data-transfer rate). The disk arrays come in 2GB, 4GB, and 8GB sizes (8GB available in external only); they are available with SCSI-2 Fast and SCSI-2 Fast and Wide interfaces and include software that enables striping (RAID 0). The internal kits are designed for use with the Power Macintosh 8100 and 8150. Fast and Wide arrays ship with a NuBus SCSI-2 adapter. Prices range from \$689 to \$3825. Conner Peripherals, 408/456-4500, 800/426-6637; fax 408/456-4501.



DiskStor External Drive

#### Genesis 230

As capacities increase, access times decrease, enhancing the desktop viability of optical media. The Genesis 230 is a 3½-inch removable-cartridge SCSI optical drive with a 44ms access time and a sustained data-transfer rate of 900 KBps. The drive comes with Microtech's Disk-Force formatting software, which is compliant with SCSI Manager 4.3. External \$1163; internal \$1098. Microtech International, 203/468-6223, 800/626-4276; fax 203/468-6466.

#### MacClass 288MT II and 288LCD

Burning up the phone lines, these V.34 fax modems can transmit and receive data at 28.8 Kbps and faxes at 14.4 Kbps. They support a complete array of ITU-T data standards, including V.32 (14.4-Kbps data speed), V.42 (data compression), and V.42bis (error correction). The units also support the V.17 fax standard and Group III faxing. Both modems are external, and the 288LCD



MarClass 288LCD

model includes a three-line LCD status display. Both models ship with Practical Peripherals' MacComCenter software. 288MT II \$279; 288LCD \$459. Practical Peripherals, 805/497-4774, 800/442-4774; fax 805/374-7200.

#### MultiSync XV15

This 15-inch multiresolution color monitor features a 0.28mm dot pitch and has a maximum resolution of 1280 by 1024 pixels at a vertical refresh rate up to 100Hz (most Mac resolutions are supported at 76Hz). The display has controls for image size, position, and appearance; is Energy Star-compliant; and meets the Swedish MPR II emissions guidelines. \$455. NEC Technologies, 708/860-9500, 800/632-4636; no fax.

#### **Personal Archiver System**

Now you can archive your data twice as fast, with this SCSI system. The heart of the Personal Archiver System is a JVC double-speed CD-ROM recording drive. A 1GB hard drive sits in the same case; users feed data onto the hard drive and then use the included software to record it on CD-ROM in one of several formats (High Sierra, ISO 9660, Mac HFS, and CD Audio). A system with a quad-speed drive is also available. Double-speed \$4095; quad-speed \$6895. Marcan, 206/635-7477, 800/635-7477; fax 206/635-7479.



Personal Archiver System

#### **New Products**

#### PersonalLFR Plus

You can make your own color slides from your desktop Mac with this 4000-line, 33-bit color film recorder. The SCSI PersonalLFR Plus has a permanently mounted 35mm camera back, can produce slides in roughly 60 seconds, and ships with Lasergraphics' MacRascol control software. \$5995. Lasergraphics, 714/753-8282, 800/727-2655; fax 714/727-2653.



PocketPac

#### **PocketPac**

Start with a 2.5-inch SCSI hard drive mechanism, wrap a case around it, and you've got a PocketPac drive. Roughly the size of a pocket calculator and weighing about 12 ounces, the PocketPac comes in 320MB and 500MB sizes; each has an average access time of 25ms and a sustained data-transfer rate of 1.7 MBps and 1.9 MBps, respectively. The drives come with cables and Microtech's DiskForce formatting software. 320MB \$854; 500MB \$1080. Microtech International, 203/468-6223, 800/626-4276; fax 203/468-6466.

#### **Precision Disk Arrays**

Mirror has announced a line of arrays ranging from two-drive, 2GB units that support RAID levels 0 and 1, up to tendrive, 90GB arrays that support RAID levels 0, 1, 4, and 5. All arrays come with the company's SCSI-2 Fast and Wide accelerator card. RAID software by Remus resides on the host Macintosh and handles the RAID duties. The software provides complete control over RAID parameters, and users can configure multiple RAID volumes over a single array. Prices range from \$3000 to \$22,000 depending on configuration. Mirror Technologies, 612/270-2718, 800/654-5294; fax 612/633-3136.

#### Proxima 8400

You never know when that small presentation to a couple of your coworkers will turn into a full-blown event with about 150 of your closest friends. You'll be covered with the Proxima 8400—it can project an image as small as 25 inches (diagonal), or as large as 300 inches. The 8400 uses an active matrix color



Proxima 8400

LCD panel (16.7 million colors) and has a resolution of 640 by 480 pixels. The projector also accepts video input (NTSC, PAL, SECAM, and S-VHS) and can be expanded with Proxima's Cyclops interactive pointer system. With this system and a special pointer, you can control your Mac directly from the projected image. \$10,795; with Cyclops \$11,990. Proxima Corp., 619/457-5500, 800/447-7694; fax 619/457-9647.

#### QMS 3825 Print System

You wouldn't ask Pee-wee Herman to lift a car—but are you asking your 6-ppm laser printer to carry your entire department? The QMS 3825 is a 38-ppm, 600-by-600-dpi laser printer that handles materials up to 11 by 17 inches. \$21,999. QMS, 205/633-4300, 800/523-2696; fax 205/633-4866.

#### Trinity PowerPak

You can't flick on the afterburners when you're using your Power Macintosh, but you can give your machine an extra burst of speed. The Trinity PowerPak clips on over the clock chip of your Power Mac 6100/60, 7100/66, or 8100/80, accelerating the machine to 80MHz, 80MHz, and 100MHz, respectively. A 29MHz chip is also available for the Quadra and Centris 610. PowerPak 61/80 \$119; 71/80 \$129; 81/100 \$149; Q(C)/29 \$109. Trinity Works, 512/338-9536, 800/278-4944; fax 512/338-1992.

#### UP-D8800 and UP-5500

There's a better way to get fast, realistic



UP-5500

color output than running to a one-hour photo lab. Both of these 300-dpi color dye-sub printers are PostScript-compatible. The UP-D8800 handles materials up to A4 size (8.25 by 11.75 inches) and can print single pages in less than 90 seconds. The UP-5500 is A5-size (5.88 by 8.25 inches) and can print at 30 seconds per page. UP-D8800 \$7995; UP-5500 \$7495. Sony Corp. of America, 201/930-1000, 800/472-7669; no fax.

#### SOFTWARE

#### **Aladdin Desktop Tools**

You can never have too many utilities. This package contains seven utilities, including Desktop SpeedBoost, which accelerates copying, duplicating, and trashing items. Desktop Shortcut places priority files and folders in a menu in the Open and Save dialog boxes. With Desktop Viewer, you can see GIF, PICT, text, and other files directly on the desktop. You also get Desktop SecureDelete (erases sensitive files), Desktop Magic-Tools (works with the Stuffit Magic continues



# Get With The Program 1200 x 1200 dpi, Adobe PostScript Level 2, At the Unbelievable Price of \$3,495.

To succeed, you need a winning program. And as Bo will tell you, a little muscle doesn't hurt either. XANTÉ® offers both with the NEW *Accel-a-Writer*® *812*. This high-resolution laser printer is engineered with print-intensive workouts in mind. With 1200 x1200 dpi, and true Adobe™ PostScript™ combined with a fast 33 MHz AMD 29030 RISC processor, you'll have all the power and flexibility you need to stay ahead of the competition — and at a price that won't weigh you down. So, if your success depends on the quality of your output, you better get with the program.

#### **XANTÉ's Winning Program**

- √ 1200 x 1200 dpi for exceptional halftones and incredibly smooth text and graphics
- √ Adobe PostScript Level 2 to guarantee peak performance, quality, and software compatibility
- √ Fast processing with a 33 MHz AMD 29030 RISC processor, 16 MB of RAM and XANTÉ's advanced controller architecture
- √ Halftone Calibration Technology that adds more definition to your halftone images
- √ Simultaneous interfacing between LocalTalk®, Centronics® parallel, and RS-232 serial
- √ HP PCL® 5 and HP-GL® 7475A emulations
- Ethernet® networkability, with concurrently active EtherTalk® and TCP/IP, as an option
- √ Supports letter, legal, A4, B5, and executive paper

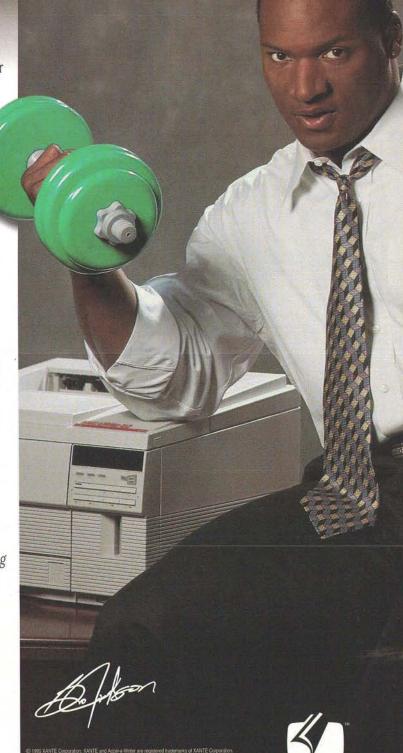
XANTÉ's Accel-a-Writer 812 — it has our competition scrambling for the gym!

For immediate output results call XANTÉ today.

**1-800-926-8839** ext. 2115 Dealers call ext. 2116 Fax 334-476-9421

MasterCard/Visa/American Express/Discover





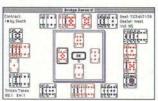
Adobe PostScript



#### Circle 114 on reader service card

#### **New Products**

Menu), Desktop Makeover (derived from the SpeedyFinder7 shareware utility), and Desktop Printer (printing tools). 2MB min. memory; requires System 7. \$89.95. Aladdin Systems, 408/761-6200; fax 408/761-6206.



Bridge Baron 6.0 for Macintosh

#### Bridge Baron 6.0 for Macintosh

With this software, you won't need to worry about finding a fourth for a rubber—or a third or second, for that matter. Users can play against Bridge Baron alone or with friends; in either case, the software tracks bidding and playing statistics. Bridge Baron recognizes limit major raises and the Jacoby 2NT raise. You can also customize how Bridge Baron plays. \$59.95. MicroLeague Interactive Software, 302/368-9990, 800/368-6672; fax 302/368-8600.



Instant Replay

#### **Instant Replay**

Still-image screen capture is passé. You can record your screen actions in living motion (at roughly 8 to 9 frames per second) with this capture utility. Instant Replay makes QuickTime movies of your screen, recording everything from cursor movements to window and menu use. There's a cursor-track recording optionyou can set a custom view size that tracks the movement of the cursor, creating smaller movies that focus on areas of interest. Instant Replay can also capture video and audio from internal or external sources (quality depends on the machine's speed). 4MB min. memory; requires System 7. \$149. Strata, 801/628-5218, 800/869-6855; fax 801/628-9756.

#### OuikDraft

Couldn't you use a little more organization in your life, particularly when it comes to sorting through the scraps of paper you usually take notes on? QuikDraft is designed to help you take and organize notes. You can begin by creating a formal outline with topics, or you can just start creating notes and link them to topics along the way. You can easily rearrange topics in the outline to better display related information, and opening a topic brings up all the associated notes. \$34.95 estimated street price. Donner Lake Software, 916/587-7450, 800/916-7450; fax 916/587-7450.

#### Sensory Overload

Have you ever awakened in the middle of a medical facility, surrounded by dead bodies and terrorists? If not, you probably haven't played Sensory Overload, a first-person action arcade game. As you race down hallways, gunning down guards and evildoers, you must find the AlphaChannel unit and uncover the secret plans of Dr. Craven. Oh, and by the way, don't forget to stay alive. 2.5MB min. memory; requires Mac Ilsi, 13-inch monitor, 8-bit color. \$69.99. Reality Bytes, 617/621-1555; fax 617/577-1209.

#### SimTower

Maxis moves from the macro to the micro with its latest Sim toy. In SimTower, you're a real estate tycoon attempting to build a skyscraper and achieve financial success by leasing out space for offices, restaurants, condos, shops, and hotels. You can track individual people, monitoring their stress levels to learn how to improve your building. You'll experience all the fears of a modern landlord, including fires, terrorist threats, and complaints from angry tenants. 4MB min. memory; requires 68030 Mac, 8-bit color, System 7. \$44.95 catalog price. Maxis Software, 510/254-9700, 800/336-2947; fax 510/253-3736.

#### TypeTamer

You may occasionally feel like using a whip and chair on your fonts, but you'll probably get better results with this fontmanagement software. TypeTamer displays the fonts used within a document at the top of the Font menu; puts the font's icon next to its name; and shows the selected font's character set, including any special characters, in a hierarchical menu within the Font menu. Keycombination-phobic users can select characters directly from the hierarchical menu, and fastidious users can organize fonts in custom groups within the Font menu. \$59.95. Impossible Software, 714/470-4800; fax 714/470-4740.



The Yukon Trail

#### The Yukon Trail

With this package you can visit another stretch of American history in the spirit of MECC's The Oregon Trail. Strike it rich in the Yukon as you learn about the geography and culture of Alaska and Canada. You weigh advice from famous historical figures and decide what supplies you need before striking out across the Yukon countryside in search of gold. A CD-ROM version is also available. 4MB min. memory; requires LC III, 13-inch color display, System 7. \$59.95; CD-ROM \$69.95. MECC, 612/569-1500, 800/685-6322; fax 612/569-1551.

#### CD-ROMS

#### Avatar

Like any great strategy game, chess has simple rules but nearly endless complexity. Avatar updates this classic with five variations on the theme. Changeling Chess, Quad, Capablanca, Nuclear, and continues



Why is QuickBooks #1? Word of mouth. It's the #1 selling bookkeeping software for small business people from the makers of Quicken. It's the #1 recommendation from retailers. And most importantly, it's #1 with users.

Because QuickBooks is so easy, you don't even need to know a debit from a credit. If you know how to write checks and invoices, you know how to use QuickBooks. Just fill in the familiar forms on the screen and it does all your bookkeeping for you. Invoicing and accounts receivable. Check writing and accounts payable. Plus all the financial reports you need to manage more profitably.

And it's fast. For instance, it finishes any repeat entry for you as soon as you start typing. It even includes complete payroll.

It's easy to tailor QuickBooks to your business. Simply choose from a list of business types and then customize the settings and reports as much as you want.

Finally! QuickBooks for the Macintosh. The Macintosh version has all of the QuickBooks features you've been waiting for. So you can get your business up and running on the most hassle-free accounting software ever, in no time at all.

Now we'll look forward to hearing the word from you.

## Try QuickBooks for only \$8.00!

Pay only shipping and handling now to try QuickBooks. If you decide to keep using it after 30 days, pay just \$119.

1-800-781-6999 Ext. 700 519

24 hours a day, 7 days a week.
Credit card orders only. Please have your card ready.

International shipping extra. Offer expires 5/31/95.

© 1995 Intuit Inc. Quicken and QuickBooks are registered trademarks of Intuit Inc. DOS and WIN versions also available. Feature sets vary.

#### **New Products**

Kamikaze all challenge chess aficionados and novices alike with new twists on an old game. \$59.95. Changeling Software, 203/292-5087, 800/769-2768; fax 203/292-5089.

#### Mountainscapes and Skyscapes

The latest volumes in this collection of stock photography cover expanses of earth and sky. Mountainscapes (Volume 5) contains 80 images of mountain peaks and valleys from around the world. Skyscapes (Volume 6) has 85 images of the skies at morning, noon, and night, in fair weather and foul. All images are on disk in high-, medium-, and low-resolution formats; high-resolution images are 1330 by 1995 pixels (at 266-pixels-per-inch resolution) and are stored as RGB TIFF files. \$59 per volume. Image Club Graphics, 403/262-8008, 800/387-9193; fax 403/261-7013.



Mountainscapes and Skyscapes

#### **Past-Tints Sampler Edition**

This collection of antique line-art illustrations can help give your designs a vintage look. The disc contains more than 300 illustrations in 9 groups: People, Garden, Illustrated Caps, Domestic Animals, Odds 'n' Ends, Transportation, Sea Life, Whimsy, and Wild Animals. Each file is saved as both a 1200-dpi and 300dpi TIFF image. \$79. Periwinkle Software, 909/593-5062, 800/730-3556; fax 909/593-6062.



Past-Tints Sampler Edition

#### The Personal Communicator

This disc combines a 1000-sign American Sign Language (ASL) video dictionary with communication and education programs. With the dictionary, you can look up words and get written and spoken definitions, as well as ASL translations. The package also includes a simple word processor and a vocabularybuilding playroom. When you click on a picture in the playroom, the software shows an animation and the ASL sign of the object. \$99. Michigan State University, 517/353-9229; fax 517/432-2650.

#### Textures of Italy

Bring a little bit of the old country to your designs with this disc of stock photography. Textures of Italy contains 100



Textures of Italy

images of textiles, food, glass, papers, marble, ceramics, architectural detail, rustic wood, and historic walls. Each file is saved in Kodak Photo CD format in five resolutions from 128 by 192 pixels up to 2048 by 3072 pixels. \$225. Clip Shots, 416/863-1774, 800/551-3826; fax 416/863-6633.

#### **AudioTower**

Multimedia just isn't multimedia unless the very air about you thrums with sound-not a likely occurrence if you're depending on the Macintosh's internal speaker. NEC's AudioTower powered speakers stand 101/2 inches tall on your desktop and plug into the sound-out port of your Mac. The speakers are magnetically shielded. \$100 estimated selling price. NEC Technologies, 708/860-9500, 800/632-4636; no fax.

#### CloseTake Lens Systems

Apple's QuickTake camera makes digital photography available to the masses, but the camera's 4-foot minimum focal range

closes the door on close-up photography. The heart of the CloseTake Close-Up System is an aluminum adapter that mounts in the lens opening of the Quick-Take and provides an industry-standard 39mm threaded opening. A variety of 39mm lenses and filters are available. The Close-Up System ships with a +3diopter lens that reduces the minimum focal range to 2 inches; a Professional System with two additional lenses is also available, and the adapter can be purchased separately. Close-Up System \$69.95; Professional System \$134.95; CloseTake Adapter \$34.95. Kaidan, 215/364-1778; fax 215/ 322-4186.

#### **PowerBook Starter Pack**

It's a little late for Christmas, but the PowerBook 100 user in your life might still appreciate this replacement nickel-cadmium battery and charger. The battery has gold-plated contact points and a manual switch that you set to let you know whether or not the battery is charged. The charger has space for a single battery and can recondition and charge a battery in roughly 11/2 hours. \$95. PowerWerks, 612/784-0701; fax 612/784-7862.

#### QuePoint

Don't get mad at PowerBook 500 owners for having a cool trackpad-get even. MicroQue's QuePoint trackpad works similarly to the ones on Apple's portable machines, and you can plug it into the ADB port of any Macintosh. The Que-Point has two buttons (left is click, right is click-and-lock), and you can also click

CONNECTIX

Your RAM with Just

What Do You Say When You're Out Of Memory?

## need more RAM.

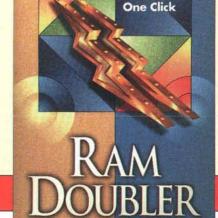
The more memory your Mac has, the more productive you'll be. But forget about adding SIMMs. RAM Doubler™ is software that doubles your Mac's memory. RAM Doubler does what it says it will do.~Macworld. And you don't have to open your Mac. Just run RAM Doubler's 15 second installation and you can run twice as many applications – instantly. May well be the best investment you make this year.~MacUser. You'll agree. Buy RAM Doubler today and double your RAM with one click. Your satisfaction is guaranteed. RAM Doubler is available wherever great software is sold (SRP \$99) or call us at 1-800-950-5880, Ext.280.











© 1994 Connectix Corporation. 2600 Campus Drive, San Mateo, CA 94403 USA. 800-950-5880 • 415-571-5100 • FAX: 415-571-5195. RAM Doubler is a trademark of Connectix Corporation. All other trademarks are the property of their respective holders.

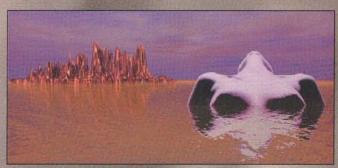


## "We have a way with worlds"

3-D program even a kid can use. KPT Bryce is magic!"



"Rocher's Glacier." © 1994 Eric Wenger.



"Nudescape." © 1994 Pieter Lessing.

"Bryce is addictive for anyone who has the slightest inclination to applications, it's dirt cheap.



"Xanades Fjord" © 1994 Eric Wenger.

## Indudes Benes CD-Rent ryce Imeging

Design and render brilliant natural and supernatural andscapes! KPT Bryce puts you in control of the creative process!

#### PURCHASE KPT Bryce TODAY AT:

Computerware 800.326.0092

MacConnection 800.800.2222

**Egghead Software** 800.344.4323

MacZone 800.248.0800

MacWarehouse 800.255.6227

COMPUSA 800.COMPUSA

Get what Publish\* calls "the hottest new graphics program to hit the Mac since Photoshop, Painter and Kai's Power Tools." November 1994

#### **KPT Bryce System** Requirements

Macintosh, Centris or Quadra (with FPU math coprocessor) or Power Macintosh family CPU, System 7.0 or higher (System 7.1 or higher for Power Macintosh), minimum 6 Mb RAM, high-density floppy disc drive.

#### Recommended:

8 Mb RAM, 24-bit color, 640x480 or larger color monitor

- \* Photo realistic backgrounds!
- \* Never-before-seen worlds!
- \* Awesome image height extrusion!
- \* Killer multi-dimensional textures!
- Startling eroded elevation maps!
- ★ Amazing image 3-D compositing!
- Beautiful skies, mists, clouds
- Incredible screen saver shows!



















© 1995 HSC Software Corp., HSC and Kai's Power Tools are registered trademarks and KPT Bryce is a trademark of HSC Software Corp., 6303 Carpinteria Ave., Carpinteria, CA 93013. Phone: 805.566.6220, Fax: 805.566.6385. Macintosh is a registered trademark and Power Macintosh is a trademark of Apple Computer, Inc. Used under license.

#### **New Products**



QuePoint

by tapping on the pad. \$149.99. Micro-Que, 801/263-1883; fax 801/263-2886.

#### BOOKS

#### The Desktop Color Book, Second Edition

Ilntended as a complete source of information on color desktop publishing, this book guides the reader through an overview of color theory and practice as implemented in desktop software, from scanning to separations to color printing. Authors Michael Gosney and Linnea Dayton show readers how to make the most of color with digital design and production tools. 130 pages. \$19.95. MIS:Press, 212/886-9200, 800/488-5233; fax 212/633-0748.

#### Detour: The Truth about the Information Superhighway

Tired of being bombarded about the most-hyped intangible of the decade? This book attempts to cut through the noise to provide information about the information superhighway. Written by Michael Sullivan-Trainor and published by Macworld's sibling company IDG

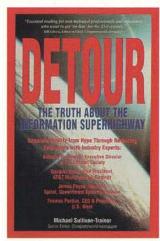
Books Worldwide, the book discusses the deployment, timing, and corporate players that will probably be involved in the highway's construction, and solicits insight from industry experts (including Vinton Cerf and Esther Dyson). The book also includes a guide to privacy, censorship, and government regulations. 319 pages. \$22.99. IDG Books Worldwide, 415/655-3000, 800/762-2974; fax 415/655-3299.

#### Exploring Fractals on the Macintosh

With help from a team of programming, mathematics, and music experts, author Bernt Wahl leads the reader on an exploration of fractal science and the basics of chaos theory. The book discusses the nature of fractals and where they're found in everyday life. Readers also learn about image compression, calculating fractal dimensions, and creating fractal programs. A disk with fractal-creation software is included. 352 pages. \$34.95. Addison-Wesley Publishing, 617/944-3700, 800/358-4566; 617/942-1621.

#### Inside the Information Superhighway Revolution

Who will control the electronic frontier? How much will it cost to build the information highway, and who will have to pay for it? These are two of the many questions that author Nick Baran attempts to answer in this book. He covers the current incarnations of the national information infrastructure (NII); their underlying technologies; and the eventual effects of the NII on business, education, and governier.



Detour: The Truth about the Information Superhighway

ment. 268 pages. \$19.95. The Coriolis Group Books, 602/483-0192, 800/410-0192; fax 602/483-0193.

#### **Love Bytes**

There's a burgeoning social scene happening, where men and women are coming together to meet for friendship and romance. It's online, and it's populated and decorated with the imaginations of thousands of people. This book, subtitled "The Online Dating Handbook," teaches readers the basics of posting messages, sending and receiving E-mail, and placing online personal ads. Author David Fox also evaluates the hot

spots on the Internet and the commercial services and provides advice both on how to approach an intriguing netter and how to deflect online harassment. 357 pages. \$18.95. Waite Group Press, 415/924-2575, 800/368-9369; fax 415/924-2576.

#### Protect Your Privacy: The PGP User's Guide

Sending data over the Internet is like sending a postcard through the U.S. mail: just about anyone can read it and, if determined enough, even change what the message says. This book is about a shareware program called PGP (Pretty Good Privacy) that uses publickey encryption along with the RSA encryption algorithm to help protect your message's integrity. Author William Stallings describes the principles behind PGP; gives instructions on obtaining the software from the Internet; and describes how to use it on Mac, Windows, DOS, Unix, and OS/2 machines. 300 pages. \$19.95. Prentice Hall Computer Publishing, 515/284-6751, 800/ 947-7700; fax 515/284-2607. m

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

#### What Do You Do With A \$100 Digital Video Camera?

## Have A Ball.

QuickCam" includes everything you need to make movies and take pictures with your Mac. Plug in one cable, install the software and you're ready to roll. Add still photos to documents, newsletters, databases. Record QuickTime® training movies, video conference, create animated cartoons – all for around \$100. Works with all QuickTime compatible software and on all QuickTime compatible Macs, including PowerBooks®. It's easy, fun, and your satisfaction is guaranteed. Get your QuickCam today where fine computer products are sold or call us at 1-800-950-5880, Ext. 280.

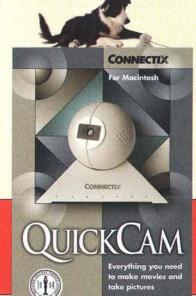
#### CONNECTIX



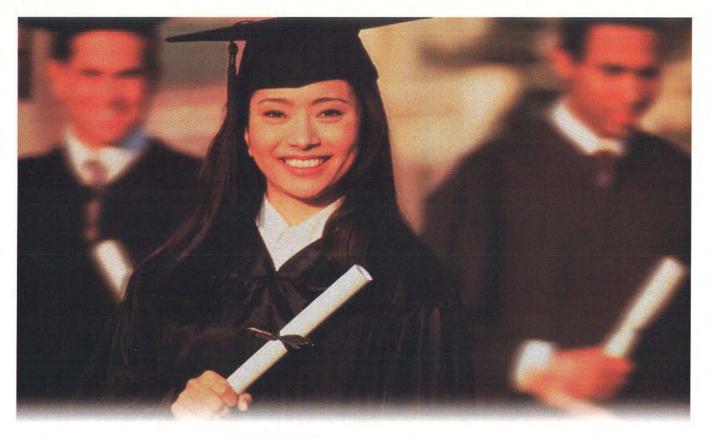








₱ 1994 Connectix Corporation. 2600 Campus Drive, San Mateo, CA 94403 USA. 800-950-5880 • 415-571-5100 • FAX: 415-571-5195, QuickCam is a trademark of Connectix Corporation. QuickTime and PowerBook are registered trademarks of Apple Computer, Inc. All other trademarks are the property of their respective holders.



## WHEN

Hey, if you weren't intelligent, you wouldn't have that important job of yours. And it's always good to have a color printer that can keep up with your ideas.

## SMARTER

That's where the QMS® *magicolor* Laser Printer comes in. It has the brains to keep you and your entire workgroup ahead of the competition.

## ISN'T SMART

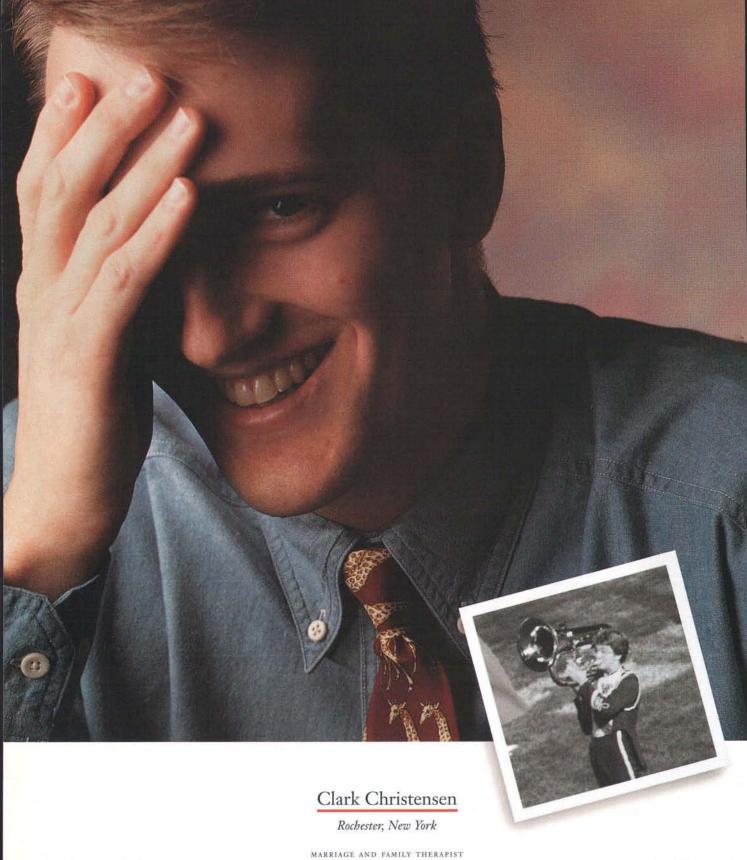
So what's that mean to you? Longer weekends, for one. Plus some pats on the back for a job well done.

## ENOUGH.

To put this great combination of your intelligence and the QMS magicolor™ Laser Printer together, do the smart thing. Call us today at 800 392-7559 Dept. 5022.



Outperform The Very Best.



WORDPERFECT FOR MACINTOSH USER

#### Used to wear bell bottoms.

#### Used to play the tuba.

#### Used to use Microsoft Word.

we all have some pretty strange things in our past.

Things like Microsoft Word, for example. Clark

Christensen used to use it. Now he uses WordPerfect®

for the Macintosh. "WordPerfect is just more

Mac-like," he says. "There's easy access to everything.

Besides, Word just got too slow and Windows-like."

Hmmm. Makes you think. Especially with new

WordPerfect 3.1. It's System 7.5 savvy and accelerated

for the Power Macintosh. It's time to get out

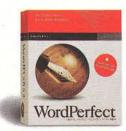
of the past. And into WordPerfect.

\$99 introductory

offer. Visit your

reseller or call

(800) 526-7820.





APRIL

1 9 9 5

# Reviews

## Painter 3

#### Paint Program

PROS: Fewer, smaller, and better-organized palettes; customizable interface; canvas rotates on screen to suit drawing style; flexible gradient designer; Image Hose sprays random background patterns; built-in cel animation.

CONS: Some commands require FPU; increased price. COMPANY: Fractal Design Corporation (408/688-8800). LIST PRICE: \$499.

MW \*\*\*\*



FRACTAL DESIGN PAINTER has long been at the leading edge of graphics applications, offering a dynamic range of extraordinary

natural-media painting options that no other Macintosh program has seriously attempted to reproduce. With version 3, the product has achieved a rare state of perfection, balancing enhanced conventional controls with spectacular effects packaged inside a tidy interface. The result is a piece of software that deserves a place on the hard drive of every professional artist and graphics enthusiast.

#### Painter Cleans Up Its Neighborhood

When it came to screen real estate, previous renditions of Painter amounted to unregulated urban sprawl. Every new feature seemed to bring with it a new palette chock-full of excessively large icons, encroaching on what screen space remained available for painting. This problem has finally been remedied by way of a complete interface restructuring that leaves few screen controls unmodified. While the palettes remain vast and intricate, their number has been reduced to eight, the icon size has been halved to the 32-by-32-pixel standard, and each palette has been reorganized and compartmentalized



to access another brush, you just open the drawer and click on the brush you want to use. Painter deletes the least-used brush from the main five and puts the selected brush in its place. You can also make as many as four of the five main tools permanent; one must remain temporary so you can swap tools in and out

of the drawer.

If you derive satisfaction out of personalizing your environment, you can customize the appearance of the interface by assigning different patterns to palettes, lining drawers with different colors, and even changing the position and softness of the drop shadows behind tool icons. You can choose from several predefined patterns on the Extras CD that ships with Painter or create your own pattern. Editing the interface may sound trivial, but it can actually help you to distinguish icons more clearly (see "My Own Private Painter").

in digestible chunks. A single palette, for example, offers access to color selection, gradations, and paper textures, all structured inside logical panels. As in previous versions, you can tear off panels if you want to access, say, color and gradation options at the same time. The exception is the Brushes palette, which no longer allows you to tear off brushes. The idea is that the brushes are small enough that you don't need to. Painter still offers more palette options than most folks will exploit in a lifetime, but now you can easily stow the ones you're unlikely to use, leaving plenty of room for the essentials.

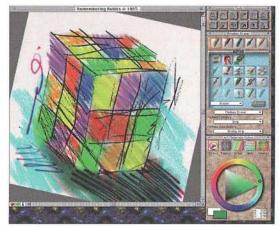
In addition to its collapsing and expanding palettes, Painter equips a few palettes with drawers, which allow you to access additional brushes, paper textures, and the like, making them available on a regular basis. For example, the Brushes palette gives you access to five commonly used brushes at all times. If you want

#### New Dimensions in Natural Media

When it comes to providing a real-world artist's studio, Painter can't be beat. Version 3.0 builds on the program's natural-media capabilities in ways that both make sense and provide tangible benefits for its users. For starters, Painter 3.0 allows you to adjust the placement of the canvas on the screen. Just as you can rotate a real-life page to accommodate your personal style, Painter lets you rotate the screen canvas without affecting the orientation of the printed image. You can access the rotate-page cursor from the keyboard, making it easy to rotate between brushstrokes without missing a step. And you can make the page upright with a mouse-click. Naturally, you will not see every image pixel when the canvas is rotated—just as you can't see every pixel when you view the image at a reduced zoom ratio-but it is a great sketching and planning tool. You can also resize the canvas, move it without constraints in the full-screen mode, and change the color of the empty no-man'sland outside the canvas.

Painter's new gradation palette is second only to Gradient Designer, which is included with Kai's Power Tools from HSC Software, and much better than the gradation palettes included with other bitmap editors. In addition to accessing the standard linear and radial color ramps, you can access conical and spiral ramps, edit the angle of gradients, tighten or loosen spirals, and change the way colors blend. You can specify the first and last colors in a gradation using the expanded color wheel (borrowed from Fractal Design's introductory paint program, Dabbler) or lift a custom color ramp directly from an image. And if that's not enough, a frivolous but fun command lets you map a gradient onto a gray-scale image to create moderately diverting psychedelic effects.

Painter 3.0's most delightful new feature is Image Hose, which sprays out a continuous stream of predefined images. Each image is an independent floater, exploiting Painter/X2's ability to mix multiple floating selections in a single document. Portions of the floater can be translucent-as in the case of drop shadows-while other portions are opaque. Floaters are stored in collections called nozzles. You can choose from more than 50 predefined nozzles included on the CD that ships with Painter, or you can create your own. You can even specify that floaters spray out in a specific order or in relation to the direction of your mouse-drag. All in all, Image Hose represents a new milestone for generating



My Own Private Painter Among Painter 3.0's vast interface enhancements are the ability to rotate the canvas and to customize palettes' background textures. I've changed the main backgrounds to a marble pattern and the drawer linings to speckled blue, to distinguish brushes and paper options. The palettes still consume a fair amount of room, but you'll find yourself well served if you use a 16-inch or larger monitor.

background patterns; using one of the predefined nozzles, for example, you can paint a field full of cloverleafs that repeat entirely randomly, without regard for a rectangular grid or any other geometrical structure.

Although this arguably exceeds the boundaries of the program's naturalmedia territory, Painter 3.0 offers limited animation capabilities. It's straight Disney-style cel animation; you draw each frame by hand, one on top of another. Painter's Onion Skin feature lets vou see up to five adjacent frames at a time (though you can work on only one of them at a time). You can also trace frames from recorded QuickTime movies, a technique known as rotoscoping. Painter isn't likely to attract professional animators, but you do have full access to the program's wealth of painting and masking tools, which is more than any animation application offers.

#### As If That Weren't Enough

Selecting and masking have received quite a bit of attention in Painter 3, above and beyond the options available in Painter/X2. Among the new masking functions is a Bézier-curve tool that can draw free-form lines or precise point-bypoint shapes. The wealth of live selection functions—though something of a chore to get used to-are uniquely flexible, enabling you to call up any selection outline and even adjust the softness of a floater without dropping it onto the canvas. Painter offers several new calculations for combining floaters. And to its considerable credit, in Painter a floater doesn't invoke nearly as much of a performance hit as does a layer in Photoshop.

I can't begin to describe the rest of Painter's new functions in detail. The Weaves palette allows you to create tartanlike patterns that Fractal Design claims you can duplicate thread-for-thread using a conventional eightharness loom. The Image Warp command lets you distort an image by dragging over a thumbnail from inside a dialog box. New dodge and burn tools lighten and darken areas to create highlights and shadows. You can now capture brush shapes to better emulate irregularly tipped tools like chalk and pastels, and you can imbue brushes with multiple colors, much as you might load a real paintbrush by rolling it on a palette.

No program is perfect, but my criticisms of Painter are minimal. A handful of commands—including Image Warp—require an FPU, preventing me from using those features on the road on my PowerBook 540c, for example. The Undo command is still not sufficiently sensitive, incapable of restoring a deleted floater or a moved selection outline. And Painter doesn't support JPEG compression, except when opening PICT files. While occasionally irritating, none of these problems interferes with the program's performance as a real-world painting environment.

#### The Last Word

Painter has never failed to amaze and amuse, but version 3.0 goes its predecessors one important step better by offering a new level of usability and genuine practicality. Quite frankly, this is the first Painter to join the ranks of such essential electronic design staples as Adobe Photoshop, QuarkXPress, and Adobe Illustrator. To its considerable credit, version 3.0 takes all the power and magic that have attracted folks to Painter in the past and enhances these qualities, repackaging them in a thoughtfully designed and logical interface. I wish the price hadn't increased-Painter 3.0 costs \$100 more than version 2.0 and \$200 more than version 1.0—but since the newest version integrates Painter/X2, which used to sell separately for \$149, I suppose I can cut it some slack. And when you consider that the product still requires a modest investment compared with most mainstream design programs, there's no doubt that Painter justifies every penny. Quite simply, it's the best image-creation program I've ever seen.—DEKE McCLELLAND

## Two Panasonic Speaker Systems

#### Multimedia Speakers

#### EAB401P Speakers

PROS: Compact design useful when desk space is slim. CONS: Very-poor-quality sound; severely underpowered amplifier; lacks separate input for external CD-ROM's audio jack.

COMPANY: Panasonic Communications & Systems (800/742-8086). COMPANY'S ESTI-MATED PRICE: \$99.



#### EAB701P Speakers

PROS: Compact design useful when desk space is slim. CONS: Poor-quality sound; underpowered amplifier; lacks separate input for external CD-ROM's audio jack. COMPANY: Panasonic Communications & Systems (800/742-8086). COMPANY'S ESTIMATED PRICE: \$249.



ANASONIC, FOR YEARS A STRONG presence in the consumer-electronics industry, has introduced a new line of multimedia speakers with personal computers in mind. These Panasonic speakers, models EAB401P and EAB701P, are tall and thin, allowing for easy placement beside your monitor in a small work space. Unfortunately, they provide much less than state-of-the-art performance.

Typical multimedia speakers must be small, to fit comfortably on a computer desk. They have to be magnetically shielded, so their magnets don't cause any unsavory screen effects at the corners of your monitor. Stereo speakers are normally placed 6 to 8 feet apart and at least several feet from the listener, but multimedia speakers must be designed for near-field listening, so they can be placed maybe 2 feet apart and a similar distance from the listener. And finally, they must deal with the effect their small size has on bass reproduction (good bass depends in part on large speakers and heavy magnets). That's why some speakers come with a separate subwoofer module.

In testing the Panasonic speakers, I drew from a number of audio sources, including regular Mac system sounds, the online sounds generated in America Online and eWorld, some popular games (such as Brøderbund's Myst), and choice tidbits from my large collection of audio compact discs.

#### Model EAB401P

The Panasonic speaker systems have a decidedly different form factor than do other multimedia speakers (which look much like regular compact stereo speakers). In the EAB401P system—the smaller of the two-the modules are each 11/3 inches wide and a bit over 5 inches high. Each module has a power switch, a power indicator, and a volume control. A single power supply has separate AC plugs for each speaker. A small plastic stand, rubber feet for stability on a smooth surface, and cables round out the package. A single set of input jacks is at the rear of each unit, and there is no provision for mixing the audio from an external CD-ROM and your Mac.

The EAB401P speakers each contain a pair of nonidentical horn speakers, with long, curving, oval tubes inside the body of the speaker case to enhance the bass reproduction, but they don't have much impact. The bass reproduction seems nonexistent. The sonic picture is not good. The audio is thin and reedy. There is no tone control to boost the low frequencies. The total of 4 watts of output power lets the speakers play at reasonable levels, but the harshness gets worse as you turn up the power. And the frequency response (the audible spectrum the speakers can reproduce) is very poor for a system of this sort.

#### Model EAB701P

The EAB701P speakers are just over 2 inches wide and about 10 inches high. They're attractive in a high-tech sort of way, with curves and ridges at both sides. Both the left and right modules include a rectangular cone speaker for midrange and high frequencies. The left module has a 3-inch woofer for bass reproduction; the right module contains the amplifier; jacks (one for the line input from your CD

drive or Mac, and the other for a microphone); and volume, balance, and basslevel controls. Panasonic provides plastic stands for stability, but the tall, thin speaker modules are still a bit wobbly and sometimes shift about when you adjust the control settings.

The amplifier is woefully underpowered. Each stereo channel gets just 3½ watts, with another 7 watts provided for the woofer. More power (if the speakers could handle it) would allow the speakers to play louder without distorting. Competitive products—from Audio-Technica, Bose, Persona Technologies, Pro-Sound, Sony, Yamaha, and others—get 10 watts per channel and more. Panasonic specifies frequency response at 40MHz to 20MHz, but the claimed loudness variation, –16dB, shows that the reproduction is far from smooth. My listening experiences bear this out.

Unfortunately, the high-technology look doesn't carry through to the sound. It's thin and slightly harsh, though noticeably more robust than sound from the smaller EAB401P system. On the EAB701Ps, voices have a nasal quality, and high-frequency reproduction, especially on cymbals, is smeared. The bass is lacking, unless you turn the bass volume control all the way up. But with the volume turned up loud, the speaker grilles and case audibly vibrate ever so slightly. The EAB701Ps don't rate well even when you compare them with a typical FM table radio.

Two CD-ROMs are bundled with the EAB701P speakers. One of the CDs has promotional material about interactive CD-ROMs, recorded in both Macintosh and PC formats; the other includes a multimedia application, Lenel MultiMedia Works, that is, unfortunately, currently available only in a Windows version.

#### The Last Word

A set of high-quality speakers can really enhance your multimedia experience, and some good-sounding products are available at affordable prices. Compared with other speakers in their price range, such as the AppleDesign speakers (both versions) and the MacSpeaker from Persona Technologies, these Panasonic models just don't provide great sound.

-GENE STEINBERG

## Virtus WalkThrough Pro 2.0

#### Design Tool

PROS: Instantaneous, interactive access to 3-D models. CONS: Modeling capabilities are limited; texture mapping can be imprecise. COMPANY: Virtus Corporation (919/467-9700), LIST PRICE: \$495.





UNDERSTANDING THE RElationship of objects to their surroundings is important to architects, interior designers, builders of

theatrical sets, and even film directors blocking out movie scenes. If you need quick feedback on the spatial relationships of your designs, nothing beats Virtus WalkThrough Pro 2.0.

WalkThrough Pro not only lets you

interact with finished models, it also gives you instant access to a design while you're creating it. As soon as you build an object, it appears in a rendered 3-D environment. Simply move the mouse and travel anywhere in the model scene without constraints. This exceptional level of interactivity makes WalkThrough Pro terrific for architectural massing studies and the analysis of interior spaces.

#### Interactive Design

Virtus WalkThrough Pro 1.0 improved on the original pro-

gram by letting you add surface textures that made for more-realistic-looking, but also more-computationally-intensive, models. On standard Macs, that meant a walk-through could slow to a crawl. However, WalkThrough Pro 2.0 runs in native Power Mac mode, giving you close to real-time response even when traversing complex, textured models. Often you'll find yourself jogging.

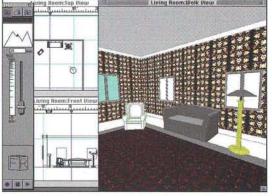
WalkThrough Pro's 3-D environment is understandable and accessible. You create and edit objects in the Design views, drawing windows (top, front, left, and so on) similar to those of 2-D drafting programs. The drawn objects automatically appear as shaded 3-D constructions in the Walk view, where you interact with the model.

Although WalkThrough Pro 2.0 lacks the object-building dexterity of general-purpose 3-D packages, it's a fairly

versatile modeler that builds 3-D objects by extruding basic 2-D shapes. You manipulate basic polygons into custom shapes using control handles; and you produce more-complex 3-D constructions, such as spires and domes, by modifying the extrusion.

The resulting three-dimensional shapes are surface objects that are hollow on the inside. WalkThrough's Tumble Editor lets you rotate (tumble) the 3-D object to any orientation and carve it into sections with a slice tool that heals the cut with new surfaces. With WalkThrough Pro 2.0, you can select 3-D objects and surfaces in the Walk view. This means you can now walk to a particular object and make it active instead of having to search for it in cluttered design views—a great improvement.

You can import digitized plans into a trace layer and draw WalkThrough



**Textured Interactivity** WalkThrough Pro 2.0 lets you explore textured 3-D models as soon as you create them.

objects directly over it. Unlike earlier versions, Virtus WalkThrough Pro 2.0 cannot import three-dimensional DXF objects. However, that is no great loss. Because of differences in how WalkThrough and other modelers deal with 3-D objects, it is usually easier to build a WalkThrough model from a 2-D foundation than to try to clean up imported 3-D objects.

#### **Texturing Surfaces**

WalkThrough's Surface editor lets you modify the surfaces of 3-D objects. Surfaces can be transparent, translucent, or textured, so they can represent doors and windows, suggest building materials such as wood and marble, or depict interior furnishings such as paintings and carpeting. Texture mapping on multifaceted objects can look ragged along the seams, and from a distance textures can look

blurry, but the ability to texture objects improves WalkThrough.

The program comes with a large assortment of textures, and you can import your own custom or commercial textures in PICT format. In addition, WalkThrough Pro 2.0 can use QuickTime files as textures, making effects like TV sets working or trees swaying outside a window possible.

Walk Through Pro 2.0 offers a smoother-shading option that softens the faceted edges of curved objects. It's not to be confused with the high-quality rendering offered by other programs, but rendering is not Walk Through's purpose. Smoother shading is a nice improvement that makes for more pleasing images.

You can save individual snapshots of the Walk view in PICT, TIFF, and EPS formats and record entire walk-throughs in both PICS and QuickTime formats. For photo-realistic rendering, Walk-Through Pro lets you export models in DXF format. However, the current Power Mac version cannot write DXF, so to export models you need to install the 680X0 version and transfer the files in emulation mode.

#### Slight Stumbles

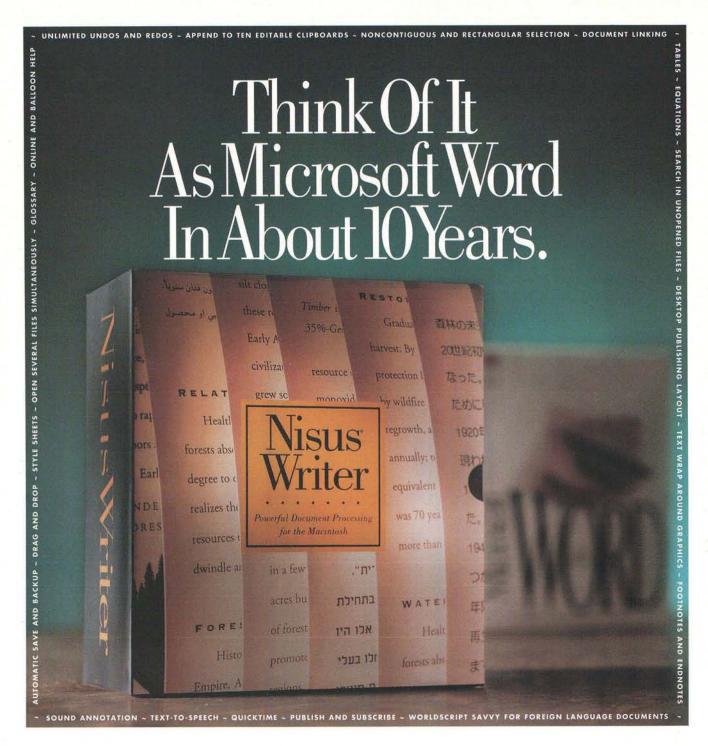
WalkThrough Pro 2.0 is not without its quirks. As with previous versions, the program sometimes quits unexpectedly, especially when walking through complex models in close-to-full-screen windows. So save your work regularly—good advice in any case.

The package comes with a good assortment of library objects with which to furnish your designs. It also includes Virtus Player, a utility program that lets you create files that can be walked through but not edited. Self-running Player files are great for distribution to clients or for stand-alone demos. In addition, WalkThrough Pro 2.0 can designate objects that behave as solids, ensuring that clients can interact with a design only within the confines of physical reality—no more walking through walls.

#### The Last Word

Aside from its occasional stumbles, Walk-Through Pro 2.0 is an exceptional program that lets you quickly and intuitively interact with your designs and gives clients the opportunity to visit and explore your creations before they are built. No other 3-D design program does that as well as WalkThrough Pro 2.0.

-CARLOS DOMINGO MARTINEZ

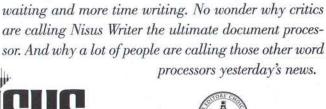


Sure, Word's impressive. But it's no Nisus®Writer. By giving you the power to manipulate text in multimedia presentations, edit lengthy books, and create foreign language documents, Nisus Writer starts where ordinary Mac word processors stop. Of course, just

because it's big on features









doesn't mean it's big on memory requirements. At just

2 MB of RAM, Nisus Writer lets you spend less time

TO RECEIVE A BROCHURE CALL 800-647-8794, OR FOR 24 HOUR IMMEDIATE FAX RESPONSE CALL 619-481-4366.

## Information Managers

#### Personal Information Managers

#### Now Contact 3.0

PROS: Can access contact info from menu bar; built-in mail merge features; tight integration with Now Up-to-Date. CONS: Can't create customized check boxes or pop-up menus for contacts. COMPANY: Now Software (503/274-2800). COMPANY'S ESTIMATED PRICE: \$69; Now Up-to-Date and Now Contact bundle \$99.



#### Now Up-to-Date 3.0

PROS: Intuitive group-scheduling features; well-designed interface; fast; good data entry shortcuts. CONS: Can't customize tool bar. COMPANY: Now Software (503/274-2800). COMPANY'S ESTIMATED PRICE: \$69; Now Up-to-Date and Now Contact bundle \$99.



HERE ARE LITERALLY DOZENS OF Mac calendar and address-book packages on the market, yet few deliver what most people are looking for—a program that is lightning fast, flexible, intuitive, and powerful enough to keep vast amounts of personal and business information organized and readily accessible. The Now Up-to-Date 3.0 and Now Contact 3.0 duo bring us a whole lot closer.

#### Now Up-to-Date

Now Up-to-Date is a power-packed, network calendar program. Like most calendar programs, it lets you view your appointments and to-do items in customizable monthly, weekly, and daily views. You can categorize individual calendar events as private (they appear on your own calendar only) or public (they appear on everyone's calendar). The program allows you to view any combination of private and public categories.

The Up-to-Date tool bar provides one-click access to most of the program's common commands. (The tool bar is not customizable, however.) Of course, you can hide the tool bar and still have access to all the commands via the keyboard.

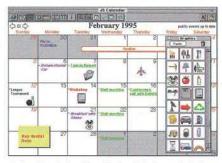
Other changes are less dramatic. A new scrolling view lets you scroll forward a day or week at a time, so you can, for example, look at the last week of March and the first week of April in the same window. Another enhancement is the Date and Time Picker, which lets you

pick the appropriate date and time from a tiny pop-up calendar and time chart within the Event Info dialog box.

For networked users, version 3.0's newly added Group Scheduling feature lets you schedule meetings based on calendar information from all Up-to-Date users logged on to the network. The scheduling window's scrollable field lists all the people, rooms, and other resources available for meetings. To invite people to a meeting, you simply drag and drop their names into the Invite field, along with the name of the meeting room itself.

The program gives you two options for picking a meeting time. First, you can open the Group View, which shows the schedules of all the users invited to the meeting in a time-line chart. The time-line chart lets you quickly spot available times and then schedule the meeting.

Alternatively, the Auto-Pick feature automatically scans the invitees' schedules and provides a list of all the common available times. Once you select a time, Up-to-Date notifies all invitees of the meeting time. Each user can then accept or decline the meeting or get more detailed information such as who else is attending and where it will be held.



**Calendar Art** Now Up-to-Date's new interface sports a tool bar and a graphics palette (on the right) that lets you add icons to monthly calendar views. The bitmapped graphics are cute, but they look terrible when resized and only those linked to appointments show up in weekly or daily views.

To use Group Scheduling and public calendars Up-to-Date's Public Event Server must be running on one of the networked Macs. (The server program is included with the Up-to-Date package.)

#### **Now Contact**

The latest versions of Now Contact and Now Up-to-Date have nearly identical interfaces, making it easy to link Up-to-Date events with Now Contact records. Now Contact provides customizable list and detail views of contact information; eight customizable fields; and a built-in word processor for creating fax documents, letters, and mail merges from within the program. Like Up-to-Date, Now Contact has a new tool bar with buttons that provide access to the most-frequently-used commands.

Now Contact's notable new features streamline data entry and contact-management tasks. The AutoType feature recognizes previously entered information and finishes typing the information for you. For example, the program will fill in the company's address for you as soon as you enter the company name. QuickFind, another new feature, allows you to locate any group of contacts by multiple category or keyword listings.

Now Contact also supports automatic contact-file synchronization between two copies of the same contact file. Like Up-to-Date, the program supports both private and public categories, so you can create contacts that are shared over the network and other contacts that appear only in your own database.

QuickContact is a system extension that allows you to search for contact information without actually launching the Now Contact program itself. You can access QuickContact via the menu bar in any application. A button in the QuickContact dialog box allows you to copy contact information for insertion in any other document, and you can add frequently used contact listings right in the QuickContact menu.

Dragging a contact from Now Contact onto an Up-to-Date calendar cell automatically creates a new appointment with the contact information filled in for you. You can copy contacts by dragging them from one open contact file to another; you can also drag a contact onto the Finder's desktop to instantly produce a tab-delimited text file containing all the contact information.

Now Contact lacks some features many people consider essential to the perfect contact database. The data entry helpers are fine, but customizable check boxes and pop-up lists for custom fields would be more helpful. Also, the eight customizable fields are a limitation.

#### The Last Word

No, we still haven't found the perfect personal information manager, but most users—especially those who need to share schedules and contacts over a network—will probably feel the Up-to-Date and Contact bundle comes closer to the ideal than any other product. Taken together, these two programs provide a set of solid, reliable tools for keeping your life and business in order.—JOSEPH SCHORR

# PowerLook out-powers the competition!



#### HOT SWAP!

PowerLook's One-Year Manufacturer's Warranty Includes "HOT SWAP" Exchange Program. Call 800-859-2728 for Details. (U.S. Residents Only)

#### **Scan With a Winner!**

For all your professional graphics and prepress needs, get the UMAX PowerLook. It's "probably the fastest flatbed scanner ever made," says HOW magazine. PowerLook's award-winning combination of blazing speed and superior image quality knocks out the competition every time. PowerLook is powerful, yet "fast (and) easy to use," according to MacUser magazine. And PowerLook comes with UMAX's own MagicScan, intuitive software that gives you scanning domination.

So for consistent, unbeatable quality, team up with PowerLook and put yourself in the winner's circle.



#### Circle 196 on reader service card

## Two Color Printers

#### Ink-Jet Color Printers

#### Apple Color StyleWriter 2400

PROS: Compact; excellent print quality; easy ink loading; inexpensive. CONS: Awkward network sharing; doesn't support PostScript; limited color-ink capacity; no cross-platform compatibility. COMPANY: Apple Computer (408/996-1010). COMPANY'S ESTIMATED PRICE: \$525.



#### Phaser 140

PROS: Compact; excellent print quality; versatile networking options; works with Macs and DOS/Windows machines. CONS: Slightly cumbersome ink loading; provides only 17 resident fonts; requires RAM upgrade to print legal-size pages. COMPANY: Tektronix (503/627-7111). LIST PRICE: \$1695



EEP DOWN, THE APPLE COLOR StyleWriter 2400 and Tektronix Phaser 140 are similar: both use compact Canon 360-dpi ink-jet printing mechanisms. But what surrounds those cores couldn't be more different. The Color StyleWriter 2400 is an economical, QuickDraw-based machine best suited to individuals or small, Mac-only networks, while the Phaser 140 is a costlier but more capable PostScript printer that can serve a small workgroup of Macs and DOS/Windows machines.

The Latest StyleWriter

The Color StyleWriter 2400 uses a Canon BubbleJet mechanism, the same one used in Canon's BJC-4000 for DOS and Windows machines. The new mechanism uses a different ink-cartridge configuration than does Apple's Color StyleWriter Pro: the Pro provided four separate ink cartridges-one each for cyan (C), magenta (M), yellow (Y), and black (K)-the 2400 provides one K cartridge and one tricolor cartridge containing C, M, and Y inks. Because the ink chambers in the tricolor cartridge are relatively small, you will need to replace its ink supply sooner-after approximately 100 pages, versus after roughly 300 pages for the Pro (and the Phaser 140). Fortunately, you do not have to toss the entire cartridge—you

can buy a new tricolor ink tank, which snaps into the cartridge, for \$21.95.

Don't need color? Yank both cartridges and replace them with Apple's High-Performance Black Ink Cartridge (\$34.25). This black-only cartridge sports more ink nozzles than the smaller cartridges, a characteristic that allows the print head to spew more ink during each pass across the page, improving speed dramatically. In my tests, the Color Style-Writer 2400 equipped with the blackonly cartridge printed a text document twice as fast as with the dual cartridges. In short, this is the first color ink-jet printer that I'd want to use on a regular basis for monochrome-only work.

The Color StyleWriter 2400 uses a QuickDraw-based driver. All the usual limitations of this approach apply: your Mac does all the processing of print jobs, so it slows when you print (and the printer's performance depends on your Mac's speed). Depending on the programs you use, you may also get chunky-looking graphics when printing encapsulated PostScript images or graphics created in programs such as Macromedia FreeHand and Adobe Illustrator. And of course, forget DOS/Windows compatibility.

You can share the Color StyleWriter 2400 on a network using the driver's ColorShare options, but it's your machine that bogs down when other people print. This drawback doesn't apply if you add the \$99 LocalTalk interface. When you use this interface, each Mac does its own processing. On the downside, because Local Talk is slower than the Color Style-Writer 2400's high-speed serial interface, printing times will generally be longer.

#### The Littlest Phaser

The fact that Tektronix's printer bears the Phaser name provides strong clues as to the Phaser 140's capabilities. Like the

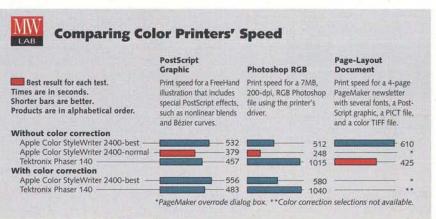


bigger, costlier, and faster members of the noble Phaser line-which use either thermal-wax or dye-sublimation printing technologies-the Phaser 140 provides built-in PostScript Level 2 and Tektronix's Finepoint image-enhancement technology, which improves the appearance of scanned images. The Phaser 140 also sports LocalTalk and parallel ports; an Ethernet port is a \$295 option. All of this standard equipment explains the printer's relatively high cost. It also adds to its girth; the Phaser 140 is almost as big as a small laser printer and weighs about 14 pounds. (The 2400 weighs 8 pounds.)

Despite its bevy of built-in features, the Phaser 140 has some limitations. The printer contains just 17 resident fonts; as with any PostScript printer, you can supplement them with downloadable fonts, but doing so increases print times and network traffic. Also, the stock Phaser 140 can't print on legal-size paper (81/2 by 14 inches); for that, you need to add to its 8MB of RAM. On the plus side, if you expand the printer's RAM to its 24MB maximum, you can print pages as large as 81/2 by 22 inches.

#### Performance and Print Quality

On Macworld Lab's test track, the Phaser 140 outperformed the Color Stylecontinues







LOSE FILE



YOUR PC

OPEN FILE
RETRIEVE DOCUMENT
PRINT DOCUMENT
CLOSE FILE

YOUR PC WITH A MOTOROLA MODEM

OPEN FILE PLAY ELECTRONIC GOLF CHANGE JOE'S SCORE READ COMICS IN LA TIMES FINISH CROSSWORD PUZZLE IN NY TIMES ORDER CASE OF CHIA PETS E-MAIL EMILY TRANSFER FUNDS BUY STOCKS ATTEMPT TO CORNER SILVER MARKET RENEW LIBRARY BOOKS PULL UP PROPOSAL FROM OFFICE PULL UP JOE'S PROPOSAL FROM OFFICE REVISE PROPOSAL FROM OFFICE LOOK UP SPAM IN ENCYCLOPEDIA CHECK HOROSCOPE FOR LOVE MATCH CALL PSYCHIC HANG UP ON PSYCHIC CREATE RECEIPTS FILE TAXES ORDER FIFTEEN PIZZAS FOR JOE PLAY POKER WITH THE GUYS CASH IN STOCKS

THAT'S WHY WE MAKE MODEMS.



Introducing the Power™ and Lifestyle™ Series 28.8 desktop V.34 modems. To some, a modem's just a box. To others, it's a way to get out of one.

© 1995 Motorola Inc. 

Motorola, Lifestyle and Power Series are trademarks of Motorola Inc.

"Plying Toasters Artwork © 1990-93 BERKELEY SYSTEMS, INC., from AFTER DARK © 2.0

Reproduced under license agreement by McCann-Erickson Atlanta. All other trademarks

Circle 207 on reader service card

#### Reviews

Writer 2400 in most tests (see "Comparing Color Printers' Speed"). (Remember that the Color StyleWriter 2400's performance depends on your Mac; we used a Centris 650 for testing.) The exceptions: the MacDraw Pro test (not shown), where the Color StyleWriter 2400's native QuickDraw gave it an edge; and the Photoshop test, where the slow transfer rates of LocalTalk worked against the Phaser 140. (The 2400 uses a fast serial connection.) When we installed the Phaser 140's optional Ethernet port, performance improved dramatically: a scanned image that took 1015 seconds to print via LocalTalk took only 609 seconds.

As for print quality, it's practically a toss-up. Both printers' drivers include color-tweaking options—the Color Style-Writer 2400 uses Apple's ColorSync technology and provides two color-matching options: Photographic or Business Graphics. The Phaser 140's Tek-Color options let you simulate the colors on-screen or those produced by a printing press. An option called Vivid Color punches up transparencies and charts.

The Phaser 140's PostScript compatibility gives it the edge when printing PostScript illustrations containing color gradients, but otherwise, both printers do an excellent job with text and graphics alike. At reading distances, scanned images look almost photographic, especially when printed on the glossy paper or back-print film that both companies sell. Overall, I give a very slight edge to the Phaser 140.

#### The Last Word

But it's not the Phaser 140's slightly better output quality that justifies the printer's higher price. What does is the Phaser 140's built-in PostScript, its cross-platform compatibility, and its superior networking features and options. If you're looking for a capable color printer for a small workgroup-particularly one containing both Macs and DOS/ Windows machines—the Phaser 140 is a great choice. It's a sharper and less-expensive choice than its closest competitor, Hewlett-Packard's \$2479 Desklet 1200C/PS. (Note, though, that HP's machine includes 35 fonts and doesn't require a RAM upgrade to print on legalsize pages.)

If you don't need built-in PostScript, you don't care about DOS/Windows compatibility, and you don't mind a slightly awkward approach to networking, buy the Color StyleWriter 2400. You'll get gorgeous color output, much faster black-and-white printing, and a slightly smaller package. And you'll save a grand.—JIM HEID

#### PhotoEnhancer 1.0

#### Digital-Photo Enhancement Utility

PROS: Offers a useful array of automatic and manual corrections for digital photos; easy to use. CONS: A few performance irregularities. COMPANY: PictureWorks (510/855-2001). LIST PRICE: \$129.



VEN A DECENT PHOTOGRAPHER CAN take bad photos using Apple's Quick-Take digital camera, which is a fun device but lacks some of the niceties of film cameras, such as focus and aperture controls. That's where PhotoEnhancer comes in. This nifty utility provides dozens of ways to improve the quality of Quick Take photos, from sharpening or softening focus

to correcting over- or underexposed shots.

PhotoEnhancer's clever interface and clear manual make the program easy to use, even for novice digital-photographers. You can open a single QuickTake image, or look at an entire folderful of images—presented graphically as slides on a light table—then open the photo you want to work on. Once the photo is displayed, you can apply picture-correction commands—lighten, darken, intensify,

equalize, soften, or sharpen—
to the entire image or a portion you specify by using one of the selection tools. You
might select an overexposed area and
darken it, for example, or soften a background to make a foreground subject
stand out. The program also offers a set
of brush tools for editing specific portions
of a photo; the Sharpen and Smooth
brushes let you sharpen or soften areas by
painting over them, while the Lighten
and Darken brushes let you add highlights or tone down flash reflections or
other hot spots.

While you can manually apply corrections one by one with the aforementioned tools and commands, you might prefer to employ the SmartPix menu, which automatically corrects for common photographic problems such as dull colors in indoor shots or cloudy-day outdoor shots, excessive contrast in bright-day-light shots, or shadows that are too dark or too light. This feature is useful for quick fixes—especially for eliminating the sickly colors of photos taken under fluorescent light—but for optimum

results, you usually have to fiddle with the manual commands.

#### **Gimme Your Best Shot**

My favorite PhotoEnhancer feature is the By Example window, which shows a grid containing nine versions of the photo you're working on, each with a different degree of correction for the problem you're trying to fix: focus, exposure, brightness/contrast, or color. Choose the picture that most closely matches what you want, and PhotoEnhancer automatically applies that image's corrections to your photo. This method is much quicker and more intuitive than choosing the commands in the Enhancement menu and waiting to see the result of each try.

Overall, PhotoEnhancer's capabilities are quite impressive. I tried it on a





**PhotoEnhancer: Before and After** To avoid the harsh shadows that appeared when I used the QuickTake's flash, I took a photo without the flash (left). Now the photo was too dark, and the colors were washed out and too blue. A few PhotoEnhancer operations later, I attained the much-improved image on the right.

shot I took at dusk, with the QuickTake's flash much too far from the subject. The initial photo appeared as a black rectangle with a few gray smudges. After about a dozen PhotoEnhancer operations, including lighten, brightness/contrast, focus, and color correction—mostly in the By Example window—I had a decent picture of my friend Bill, wearing a blue jacket and standing by a red truck. Amazing!

I ran into a few software glitches, including instances where the program performed operations for 15 or 20 seconds without indicating that it was processing, making me think it had perhaps frozen up (it hadn't). Also, I experienced a couple of crashes when using the Save As command—but I couldn't consistently duplicate the problem.

#### The Last Word

None of the flaws I came across were sufficient to stop me from recommending the program. If you want to improve the quality of your QuickTake photos, you need PhotoEnhancer.—ERFERT FENTON

NOW 3.0

Orer 15 Heart Features!

Over 15 Heart Features!

# Simple Scheduling. Impressive Power.

\*\*\*

"If you're looking
for a quick and easy
way to create
Gantt charts, this
program might be
just the one for you."
Macuser



"...An excellent choice for anyone whose primary need is to create precise, presentation-quality Gantt charts."

MacWEEK



		_	DIST	Project Schedul			SELECTION OF
	/A C\$1371\$37	Ctant	Finish	1996			Actual
-0		Date	August 5 12 19 26	September 2 9 16 23	Octob 7 T	Duration	
, "	Design			8/11 8/30		4 4	19.10
2	Brainstorming	8/11	8/18	-			7.14
3	Research	8/18	8/23	<b>****</b>			4.98
	Marketing	8/23	8/30	<b>←</b>		0-0	6.98
5	Testing			8/17	9/17		31.06
	Prototype	8/13	8/25	<b></b>		19 19	11.88
,	Drawings	8/25	9/2	<b>(</b>	_		8.28
	Build	8/25	9/14	<b>→</b>		Monthly review meetings on last Friday of every month	19.60
9	Monthly Reviews			Fri, Aug 30 🔷	Fri, Sept 27	Fri, Oct 25	
10	Production				9/17	111	50.96
,,	Factory Prep	9/17	10/7			<b>+</b>	20.30
12	Materials Delivery	10/7	10/21			*	13.30
13	Production	10/21	11/2			*	12.18
14	Begin Shipping	11/7				Nov 7	+
				Wk 1 Wk 2 Wk 3 Wk 4	Wk 5 Wk 6 Wk 7 Wk	8 Wk 9 Wk 10Wk 11Wk 12Wk 13Wk	14
				Month 1	Month 2	Month 3	

## FastTrack Schedule™

No other scheduling tool is as easy-to-use or as powerful as FastTrack Schedule. There's no need for cumbersome project management packages, spreadsheets, or time-consuming drawing programs. Simply click and drag—or use your keyboard—to create presentation quality schedules in no time. And if you have questions, the extensive on-line help can assist, tutor, or remind you of every step.

Need more power? FastTrack Schedule can track scheduled, revised, and actual dates, calculate durations based on a custom work calendar, outline your projects, and link activities to show dependent tasks. Further enhance your schedules with custom bars and milestones, flexible timeline scales, and colorful graphics. And because FastTrack Schedule runs on either Windows or Macintosh, files built on one platform can be opened on the other.

To order, for more information or for a demo call today!

1.800.450.1982

#### ArtPad

#### Pressure-Sensitive Tablet

**PROS:** Diminutive size; serial-port version is cross-platform compatible; precise sampling rate; plenty of pressure levels; high tablet resolution; inexpensive. **CONS:** May be too small for some professional work.

COMPANY: Wacom Technology (206/750-8882). LIST PRICE: \$199.

MW \*\*\*

OUR DESK SPACE MAY NOT QUITE compete with the battle-strewn environment that greets me every morning, with a 21-inch monitor, a flatbed scanner, two removable-media drives, a PC, a Mac, a telephone, roughly 5 miles of connecting cable, and a forestful of paper all jockeying for room. But I bet you've covered nearly every inch of horizontal surface with some precious item that you can't possibly move.

Luckily, Wacom's ArtPad doesn't require much space. Measuring less than 7 by 7½ inches, it's actually smaller than the smallest mouse pad in my office. When I'm not using it, I stash the ArtPad under my mouse pad and toss the featherweight UltraPen stylus in my pencil cup. Thus the ArtPad is the first tablet to sit on my desk for more than a week.

The ArtPad comes in serial and ADB varieties, both of which I've had the pleasure to use over the past few months. The serial tablet requires a separate power supply that plugs into the back of the serial connector, thus occupying more room on your power strip. But it's also set up to work with both Macs and Windows PCs right out of the box, a real bonus for cross-platform users.

If you're strictly Mac-monogamous, the ADB version of the ArtPad offers a couple of advantages over its serial coun-

terpart. Like all ADB devices, it gets its power directly from the ADB port, which keeps the cabling to a minimum and doesn't take up that serial port you use for your modem. The ADB connector also offers a throughput connector, so you can use both tablet and mouse from a single ADB port. (Incidentally, if your ADB port is at or over the supposed three-device maximum, it may be helpful to know that the ArtPad draws 100 milliamperes of electricity, letting you add it to your mouse-and-keyboard chain with plenty of power to spare.)

Constrained by neither cord nor battery, the UltraPen stylus borrows its weight and measurements from a conventional drawing pen, giving it a familiar feel. The pen affords 256 levels of pressure and a sampling rate of 205 reports per second, bringing it up to the same performance level as that of more-expensive tablets from Kurta and Cal-Comp. The control panel allows you to scale the tablet to your screen (or screens), specify the purpose of the UltraPen's side switch, and assign macro functions.

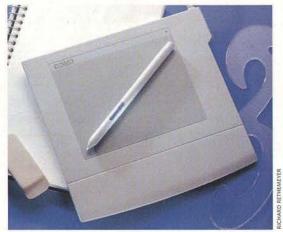
Despite its compact design and precise controls, it's unlikely the ArtPad will corner the professional drawing market. For one, the tablet lacks a transparent overlay for tracing. And unlike some CalComp pads, Wacom's doesn't offer support for pen tilt, another variety of natural-media emulation. Perhaps most important, some professionals may find the ArtPad's 3¾-by-5-inch active area too small. A 2-inch stroke, after all, translates to a long, 7-inch swipe on my monitor.

Still, the tablet offers a resolution of 2540 lines per inch, meaning that a single square inch of tablet space contains as many unique data points as do six 21-inch monitors. In other words, the tablet is sufficiently accurate for editing very-high-resolution images even in reduced-view sizes. The only factor that matters is your personal drawing style.

Furthermore, you have to love the price. Not only does the ArtPad cost less than half as much as larger tablets, but also you can purchase it bundled with Fractal Design's introductory paint program, Dabbler, for \$239.

#### The Last Word

Suffice it to say, if you naturally draw small and you're looking for a device you can hide away one moment and readily exhume the next, the ArtPad is sheer convenience.—DEKE McCLELLAND



#### MultiClip Pro 3.1

#### Clipboard Utility

PROS: Flexible storage and formatting of Clipboard and Scrapbook items; convenient, almost seamless operation. CONS: Slower than real Clipboard; mediocre editing tools.

COMPANY: Olduvai Corporation (305/670-1112). LIST PRICE: \$59.

MW ★★★★

LDUVAI'S MULTICLIP PRO IS A Replacement for the Mac's Clipboard and Scrapbook; it's so simple and so elegant that it makes you wonder why Apple hasn't yet adopted it.

MultiClip Pro consists of an application, an extension, some auxiliary files, and a one-button installer that places everything in its proper location. The application must remain open for MultiClip Pro to function, while the extension lets you work directly in another application. MultiClip Pro comes with keyboard shortcuts (which you can change if they conflict with those of other programs) for copying or cutting material from your documents. The items are saved as separate editable windows, or ClipFrames, in a document window called a MultiClipboard.

You can paste items from a Multi-Clipboard at the insertion point in your document, but unlike with Apple's Clipboard, you can copy item after item into the MultiClipboard—losing none of the items in the process—and paste them in sequence, one at a time, into your document. The program also gives you the option of pasting in reverse order. Or you can use a pop-up menu to select a specific item from a MultiClipboard to place in your document. ClipFrames can consist of graphics and text objects, including QuickTime movies and publish-and-subscribe edition files.

You don't lose the contents of a MultiClipboard if you quit MultiClip Pro or restart your Mac (although you do have the option of clearing the MultiClipboard when quitting the application).

If you wish to store items, you can create collections of ClipFrames that are somewhat like Apple's Scrapbook, except that you can open more than one collection at the same time and copy items between them. A rudimentary set of graphics- and text-editing tools let you make minor changes in your ClipFrames before you use them. A search tool lets you locate ClipFrames by text content or by title.

Should Graphsoft's MiniCad 5 be your CAD Program?

I want a full-featured, proven market leader which can handle any job: 2D, 3D, cost estimation and client presentations.

I want a program that runs on both the 68K-based Macintosh and the Power Macintosh. At no extra charge!

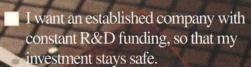


I want a CAD program that is tailored to my needs, with specialized tools for architecture, mechanical engineering and design.

Take the Quiz.

I want an expandable CAD program which can be customized for specific solutions easily and inexpensively.







MiniCad 5 offers all of the above and mon software has been hailed as the "features champion" by Macworld The award-win Magazine. Graphsoft is dedicated to aggress nvestment in CAD & D. Graphsoft customers stay more productive than their competitors because Graphsoft supports both the technology and evolving user needs. MiniCad has long been the price/perforway from MiniCad by VARS who want you to buy high-priced CAD products mance leader in Macintosh CAD. Don't be stee that are hard to learn and only do a few things well VARS won't tell you that MiniCad 5 ships with a multi-media training CD, or that you receive 18 months of free technical supply with Graphsoft products or upgrades. In short, MiniCad keeps more of your money in your pocket. Buy MiniCad 5 and save!

MiniCad 5 also includes: speed increases up to 100% even on 68K-based Macintoshes, a Claris CAD conversion program including a \$495 competitive upgrade price, a Claris CAD translator, and a helpful conversion guide, translators for importing and exporting to the other major CAD products, an upcoming Windows version, multi-media training CD, 18 months of free technical support, and a no-hassles 45-day money-back guarantee through authorized dealers. Contact Graphsoft today for detailed literature. To order immediately, call MacWarehouse, MacConnection, or your local dealer.

#### Mechanical, Architectural, & Advanced Design Modules Included.























Blueprint

The ultimate map creation tool, including nine cartographic projections and more! Used by US News & World Report. 4 mice

Full-featured 2D drafting. Experience ease of use, high precision and an affordable price. 4 mice.MacWorld Editor's Choice!

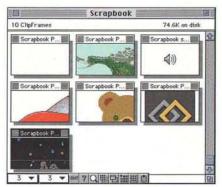
10270 Old Columbia Road, Columbia Maryland 21046 Ph:410-290-5114 Fax: 410-290-8050

Power Macintosh is a trademark of Apple Computer Inc. MiniCad, Blueprint, and Azimuth are trademarks of Graphsoft, Inc. Claris CAD is a trademark of Claris Corp.

#### Reviews

Some of MultiClip Pro's capabilities are also found in Now Scrapbook, part of Now Utilities from Now Software. But MultiClip Pro's keyboard shortcuts and ability to store more than one item in a single MultiClipboard provide a much more seamless transfer of data.

There isn't much of a downside to all this convenience and flexibility. The MultiClip Pro application takes a little over 1MB of RAM, but if your Scrapbook collections contain huge files, you might have to give the program a bigger memory partition with the Finder's Get Info command. Also, some programs use their own proprietary clipboards, meaning you may have difficulty copying material from them to a MultiClipboard. When I tried to copy objects from a PostScript drawing program (Adobe Illustrator), the



The End of Apple's Clipboard and Scrapbook? MultiClip Pro can use Apple's own Scrapbook as part of your new collection.

objects were displayed with a PostScript logo and were uneditable in MultiClip Pro. The keyboard shortcuts are almost, but not quite, transparent; there is a distinct pause, and just a flicker of your document window, when you copy or paste items to or from the MultiClipboard.

As I wrote this review, Olduvai had posted a public beta of MultiClip Pro 3.2, which adds support for System 7.5 features such as drag and drop. The beta, an updater application, is available to existing users direct from Olduvai or through its support areas on America Online, AppleLink, and CompuServe. If you are using a drag-and-drop-aware program such as WordPerfect 3.1, the update is a worthwhile addition to an already fine program.

#### The Last Word

MultiClip Pro is what Apple's Clipboard and Scrapbook should have been: an easy-to-use repository of data that moves between your documents without fuss or muss. Once you get used to this program you'll find it hard to do without it.

-GENE STEINBERG

#### FullWrite 2.01

#### **Word Processor**

PROS: Integrated outliner; high-end features; good manual and online help; more memory-efficient than competitors. CONS: Complex modular architecture; table editing unwieldy; few file-conversion filters provided; inflexible multicolumn formats; no telephone customer support. COMPANY: Akimbo Systems (617/776-5500). LIST PRICE: \$395.



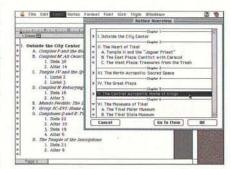
ULLWRITE 1.0 WAS A SLOW AND UNwieldy memory hog but had a panoply of features that were the envy of every other high-end word processor. Akimbo Systems recently resuscitated FullWrite, but while the program struggled to survive, its competitors gained ground and, in many cases, bested Full-Write's former strengths.

FullWrite's modular architecture allows you to create a custom word processor containing only the needed combination of features. Modularity also makes it easy for Akimbo (and other developers) to upgrade or enhance the program. Simply by dragging FullWrite extension files into or out of a folder, you can add or remove anything.

That, ironically, is the problem. Akimbo unwisely mixed interface options with program modularization. As a result, the number of extensions is mind-boggling—more than 100 ship with the program. There is no obvious way to manage them or even figure out what's available, and customizations that should be simple are not.

#### New Table d'Hôte

FullWrite's tables require using special rulers that are more difficult to use than



**Outline Anytime** FullWrite's built-in outliner resembles the Finder's By Name window view, allowing you to expand and collapse entries. The Outline Overview window lets you navigate within and reorganize complex outlines quickly. FullWrite can use outline headings to create a table of contents.

the table editors in other word processors. There is also a convenient tool for copying character styles. A smart dragand-drop text feature adds and deletes spaces intelligently, but you can't drag text to a different document, and the lack of an insertion-point indicator makes for some guesswork. Other new features include an equation editor.

Some features have been changed. For example, FullWrite can now insert glossary entries automatically. You can enhance sidebars with color text, backgrounds, and borders, and you can place graphics in the background as a watermark. An editable view shows two pages side by side, and in addition to indicating text changes with vertical bars, Full-Write can underline changes or display them in a different color. FullWrite uses XTND translators for file conversions, but it comes with translators only for MacWrite 5, MacWrite II, and plain text.

FullWrite 2 is still the only word processor that can wrap text around an irregularly shaped object, and the only one with a bibliography tool (albeit a simple one). The posted notes are still a pleasure to use. Although menus no longer display different commands when you press option or shift, you can still open and scroll through FullWrite's menus entirely from the keyboard.

FullWrite retains its high-end features, including multilevel table-of-contents and two-level index generation; automated cross-referencing; footnotes; endnotes; a spelling checker; a thesaurus; a basic drawing module; character and paragraph styles; mail merge (the oldfashioned, mainly manual variety); and automatic renumbering when you move numbered bullet points or items in a list. FullWrite cannot, however, generate lists of figures or tables of authorities. Its findand-replace is comparatively weak, it can't split windows into multiple views, and its columns are limited to one format per page. FullWrite is missing tool and button bars, a grammar checker, a menu of recent files, and enlarged views. And there is no Power Mac version.

#### The Last Word

FullWrite 2 is now the leanest of all highend word processors; the application is only about 800K and requires a 2MB RAM partition. FullWrite 2 is also faster and more responsive than earlier versions. If you need a high-end word processor and don't have the horsepower to run Word 6 or the need to share files with the Word/WordPerfect crew, FullWrite is definitely worth considering—especially with Akimbo's \$120 competitive upgrade offer.—ROBERT C. ECKHARDT

## Revolutionizing an industry happens once in a lifetime. Okay, maybe twice.



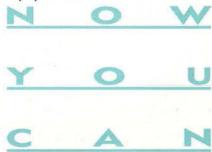
hen the world asked for color, Canon responded with the revolutionary Color Laser Copier. Today Canon is answering your color needs with another visionary advance the Canon Color Laser Copier 800 and 700 color solutions.

This extraordinary breed of copiers produces images so sharp, so vivid, they're virtually indistinguishable from the original. And Canon copiers are highly productive, too.

They make a swift seven fullcolor copies per minute on a variety of materials including card stock. Auto-feed OHP transparencies efficiently by cassette. Make multipage documents effortlessly with the optional Recirculating Document Feeder and Sorter. And the Color Laser Copier 800 is the first color copier ever to offer *Auto Duplexing* for automatic two-sided copies.

You can also transform these exceptional color copiers into ultrafast, full-color, plain paper printers with optional print controllers and Intelligent Processing Units (IPUs), so you can make brilliant color output directly from your computer or network.

For a free Color Solutions Guide that will tell you more about the Canon Color Laser Copier 800 and 700, as well as the rest of our color copier line, call 1-800-OK-CANON. When the rest say you can't, Canon says you can.





#### Adobe Dimensions

#### 3-D-Effects Software

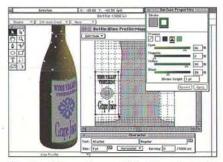
PROS: Greatly enhanced feature set; includes several Adobe fonts; good documentation; fast native Power Mac version. CONS: Can't mix fonts, sizes, or styles within a text block; can't render in the background; limited surface-texturing options. COMPANY: Adobe Systems (415/961-4400). LIST PRICE: \$199.

MW ★★★★



ADOBE DIMENSIONS FIRST appeared in 1992. Version 1.0 was designed to be an adjunct to Adobe Illustrator—a utility that would let

you take an Illustrator drawing or other image file and add 3-D effects to it. Accordingly, Dimensions 1.0 didn't let you set type within the program, and it had no drawing tools of its own—it didn't even have a Print command. It was, if you'll pardon the expression, a rather one-dimensional program.



**The New Dimensions** Adobe Dimensions 2.0's Map Artwork window provides text and drawing tools for creating images that you can map onto a 3-D surface. Here, the window contains a label design for a bottle.

Dimensions 2.0 is here, and is it ever an improvement. It still dovetails with Illustrator, but it also sports a well-rounded set of features that let it stand on its own. And it's now a native Power Mac application, so 3-D rendering takes place in far less time than on 680X0 Macs.

One thing that hasn't changed is Dimensions' PostScript orientation, and in this regard, Dimensions differs dramatically from 3-D-effects programs such as Pixar Typestry 2.1 (see *Reviews*, *Macworld*, February 1995). Typestry's end result is a bitmapped image with a fixed resolution: you can't resize it without introducing distortion. Dimensions' end product is a PostScript illustration that can take advantage of PostScript's resolution independence: you can resize a

Dimensions-generated image without distorting it, and you can take full advantage of high-resolution output devices such as imagesetters and film recorders.

Another advantage of Dimensions' object-oriented approach is that you can export a Dimensions image and modify it—change its stroke and fill attributes, resize it, rotate it, and reshape it—using Illustrator or Macromedia FreeHand.

Dimensions' new features work much like their counterparts in Adobe Illustrator. The 2-D drawing tools let you create lines, curves, and text, all of which you can then turn into 3-D objects with the Extrude or Revolve commands.

The 2-D window's text tool provides character kerning but doesn't let you mix fonts, sizes, and styles within a text box.

You can rotate and resize 3-D objects and add any number of light sources. And while Dimensions 1.0 was color-blind, Dimensions 2.0 lets you create colored light sources and specify colors for object surfaces. You can also map two-dimensional artwork (such as a product label created in Illustrator) onto a 3-D surface that you've drawn in Dimensions.

One thing you can't do in Dimensions is add the kind of realistic textures—brick, stucco, shiny metal, marble—that are the hallmark of 3-D images generated in programs such as Pixar Typestry. That's because Dimensions creates 3-D images by creating PostScript blends; it can simulate degrees of shininess, but it can't make marble.

Calculating and displaying large numbers of PostScript blends isn't for the faint of processor. Fortunately, the native Power Mac version of Dimensions 2.0 is up to the challenge. In my tests, a Power Mac 7100/66 rendered images more than four times as fast as a Quadra 840AV.

Another timesaving feature, new to Dimensions 2.0, is the ability to render only a selected portion of the image. Unfortunately, Dimensions doesn't let you switch to another program while it renders in the background.

#### The Last Word

Dimensions 1.0 broke new ground by letting designers create 3-D effects and objects while retaining the output-quality advantages of PostScript. Dimensions 2.0 builds on that foundation by adding color support as well as the drawing and text tools (and Print command) that should always have been there. Dimensions can't create the photo-realistic renderings that bitmapped 3-D programs can, but its ability to create resolution-independent 3-D images and map two-dimensional art onto them earn it a place on a designer's hard drive.—JIM HEID

#### HoloGate 1.0

#### Electronic-Mail Gateway

PROS: Sophisticated scheduling; automatic enclosure processing; UUCP support.

CONS: Expensive; no SMTP or NNTP support; no PowerTalk support; poor error handling; poor documentation. COMPANY: Information Access Technologies (IAC) (510/704-0160).

LIST PRICE: First two modules \$500; each additional module \$500.



NTERCONNECTING E-MAIL SYSTEMS from different manufacturers is a tricky business. It's trickier still if you also want to connect the same systems to global Internet E-mail. HoloGate's mission is to simplify such connections by acting as a moderator, or gateway, between E-mail servers. In addition, HoloGate supports the collection and distribution of Internet newsgroups and the sophisticated scheduling of recurring tasks.

HoloGate can transfer E-mail between Microsoft Mail, CE Software's QuickMail, Casady & Greene's Snap-Mail, ResNova Software's NovaLink, SoftAre's FirstClass, and Unix UUCP mail servers. For all but the last, Holo-Gate interacts with other servers through your AppleTalk LAN; and except when interacting with Microsoft Mail, Holo-Gate need not run on the same machine as the foreign LAN mail servers.

Each foreign server talks to HoloGate through a gateway module that you install in your HoloGate configuration. HoloGate comes bundled with two gateway modules of your choice; additional modules cost \$500 each. The basic package contains a disk with the HoloGate program and your initial gateway modules, as well as a manual covering all of the available modules.

Installing HoloGate is a complex task that isn't helped by the ponderous, poorly organized, unindexed manual. The package contains no instructions for loading HoloGate (I eventually guessed at copying the contents to my start-up drive—HoloGate would not run from a non-start-up drive), and the program disk contains no installer. Setup instructions for the various gateways are spread throughout the manual.

The lack of comprehensive error logging or messages describing problems make the configuration process difficult. HoloGate announces all errors by displaying the single word *failed* in the stacontinues

20,000 of the best highresolution photographs chosen from the

> millions submitted to Corel!

Royalty free for use in everything from advertisements to presentations!

D-ROMs 20,000 Photographs



"The World's Best Digital Photo coffee-table book and CD-ROM (Also sold separately)

#### ALSO INCLUDES:

- Corel Visual Database Search for specific images from the 20,000 photographs available using descriptive keywords.
- **Full Color Reference Manual** -Displays all 20,000 photographs.

#### Corel Photo CD Lab

- Corel Mosaic Visual File Manager
- **Corel Artview Screen Saver**
- Windows Wallpaper & Flipper
- HIGH RESOLUTION 5 resolutions from 128 X 192 up to 2048 X 3072. Each image is approximately 18 megs (uncompressed).
- COLOR FUNCTIONALITY Grayscale, 16 colors, 256 colors or RGB (24 bit).
- **EXPORT FILTERS** -Macintosh: TIFF or PICT. Windows: TIF, BMP, EPS, PCX or GIF.
- COMPATIBILITY Can be read by any CD-ROM player (XA support not needed). All photographs are in the Kodak Photo CD format.



#### Volume Sets:

Selected from the Corel Professional Photos collection on CD-ROM!

**CD-ROMs** 

#### Individual Titles:

- 100 stunning photographic images on CD-ROM.
- Hundreds of individual titles available.
- The world's largest collection of royalty free stock photography images.





-800-222-2808





#### \$ ATTENTION \$ PROFESSIONAL PHOTOGRAPHERS!

If you are a professional photographer interested in having your photographs published in the world's leading photo CD-ROM collection, please

1-613-728-0826 ext. 85080

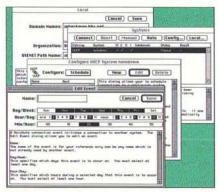


#### Reviews

tus window. You must then enter a debug mode, for which the manual provides no explanation, to try to reproduce the problem and puzzle out a solution.

Once you slog through the installation and configuration process and actually get HoloGate running, it does its job. Mail sent, for example, by a QuickMail user to a user running Microsoft Mail appears within seconds in the destination user's in-box. HoloGate automatically sends messages too large for a particular destination system as an enclosed file, and automatically encodes and decodes attachment files using BINHEX or UUencoding when routing mail through an Internet gateway.

HoloGate's Internet connectivity, however, is limited to the primitive and convoluted UUCP (Unix-to-Unix CoPy) protocol, which is rarely used when more advanced protocols, such as SMTP (Simple Mail Transfer Protocol) and NNTP (Network News Transfer Protocol) are available. Unless you currently have a Unix system in-house running UUCP, you'll be hard-pressed to find an Internet provider supporting it (although IAC itself sells UUCP service and includes a one-month free trial in the kit). Finally, HoloGate doesn't support MIME (Multimedia Internet Mail Enclosures) or Apple's PowerShare gateway standard at all. Many MIME- and PowerShare-capable gateway products (for example, Star-Nine Technologies' StarNine) cost considerably less than HoloGate's stiff \$500 entry price.



**HoloGate Watches the Clock** HoloGate lets you schedule batch online sessions by the day, hour, and minute, so you can set up multiple schedules as necessary for mail and news-data exchange with various host systems.

#### The Last Word

HoloGate comes up price-rich and feature-poor. HoloGate's two unique features—UUCP and Usenet news distribution—are the primary reasons to consider this product. If you need them, HoloGate may be for you.

-MEL BECKMAN

## Expresso 1.0

#### Calendar and Address Book

PROS: Easy to use; nice graphics; blotter-style desktop-calendar feature. CONS: RAM-hungry; minimal contact features. COMPANY: Berkeley Systems (510/540-5535). LIST PRICE: \$69.99.

MW ★★★

VERYBODY AND HER GRANDmother seems to offer software to organize your life, but so far no knockout program has claimed the prize. Berkeley Systems, undisputed champion of the screen-saver market, now steps in with Expresso, a calendar and address-book

program. Can Expresso go all 15 rounds against your disorganized life? That depends on how complex your life is.

Expresso's main claim to fame is that it puts a full-screen calendar on your Mac's desktop, just like the paper blotter calendars that sit on top of real desks. A Flashback feature toggles the application on and off from an icon in the menu bar. Click on the icon once to put up a static version of your calendar as a desktop pattern; click again to make the calendar an active window.

Since you'll be looking at your calendar a lot, you'll want to like what you see. Berkeley

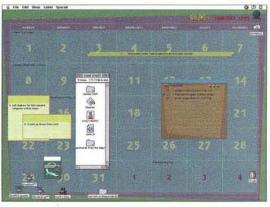
Systems offers 20 calendar designs in the basic Expresso package, with more in the works. (In November the company brought out a version with six *Star Trek* "looks.") Each look has its own colors, calendar design, and TrueType font, and some include basic animations that can run in the background at idle times. Practically speaking, many of the designs are difficult to read day in and day out; I ended up switching to the most basic pattern.

The easy-to-use calendar has a straightforward interface and simple text entry. It provides banners; a basic alarm; support for repeating events; a to-do list; and daily, weekly, and monthly views. Information from Expresso prints out nicely, in daily, weekly, and monthly layouts based on the current look. You can scale layouts to fit most Day Runner–style organizers. Expresso lets you assign priorities to to-do items, and you can archive your lists for later reference.

Expresso's weakest point is its address book. The program uses a rotary-card-file metaphor for displaying contact data.

The cards include the essential fields, but you can't customize fields or categories or other types of information you might want to show. The space on the card limits the amount of information you can enter, so contacts having multiple addresses require multiple cards.

Furthermore, to be useful, contact data should be easily and quickly accessible from the calendar. Expresso claims to support drag-and-drop linking between the address book and the calendar and to-do list, but links between the two components are weak. For instance, if you drag "12:30 lunch date with Sarah" from the calendar to your address book, that exact text drops into a single address-book entry field, adding a rather garbled entry to your contact list. Expresso won't cross-reference Sarah with any of the Sarahs



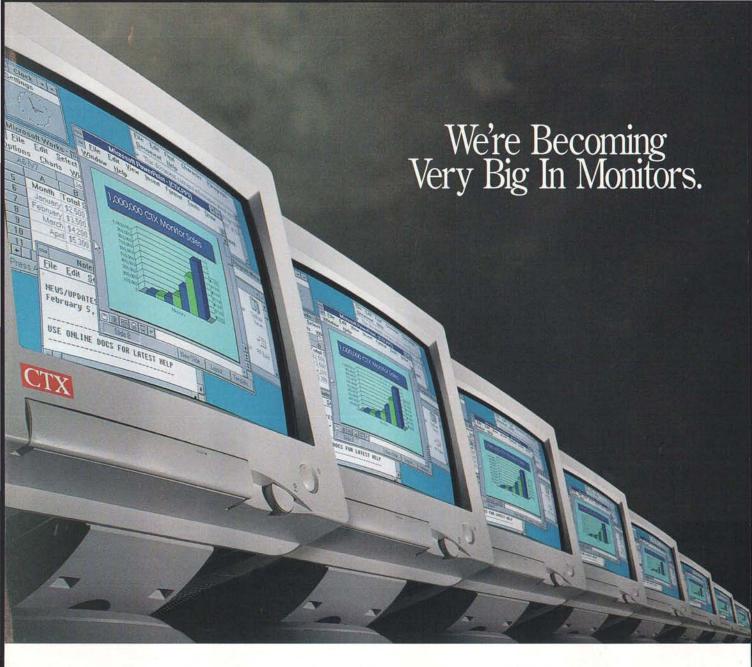
**Everything but the Coffee Stains** A Flashback feature takes a snapshot of all active Expresso windows and puts it on screen as a desktop pattern, allowing you to capture your to-do list, sticky notes, and calendar for a quick reminder of how busy you are.

in your address book so you can remember which one you're supposed to see and check her phone number. Expresso can link only one to-do item or person to a calendar entry, making it useful for only the most rudimentary tasks.

Also, the full-screen calendar view poses a problem: clicking on the calendar window sends all the other Expresso windows behind it, making it impossible to drag information from the calendar to your address book or to-do list.

#### The Last Word

I can't recommend Expresso to anyone who needs a full-featured information manager. Furthermore, 2MB of RAM is a lot to demand for a simple application that most users will want to run in the background. But Berkeley Systems' just-the-basics approach might be just fine for people who don't need the feature set of other calendar programs and can get by with a bare-bones contact manager—especially if they go for Expresso's graphics.—MATTHEW HAWN



Imagine this: Once every 15 seconds someone in the USA buys a new CTX color monitor.

That's a million last year alone – more even than sold under big names like NEC, Sony, IBM and Mitsubishi\*.

And that's before the international experts started raving about our bigger, new, high-performance 1765GM and 1785GM 17-inch "green" monitors:

"Best 17-in. monitor" (Monthly PC Magazine, Japan).

"Best 17-in. monitor" (Monthly PC Magazine, Japan). "Best overall performance" (Soft & Micro Magazine, France). "One of the best monitors...bright, sharp display and excellent colors" (Windows Magazine, Sept. '94). "Symbol of Excellence Award" (CETDC/ Business Week Asia, Taiwan). "Best Display Products" (Computex/Byte, Taiwan).

Not only does the larger, flat-square tube give you

more display area for Windows,<sup>®</sup> an ultra-fine .26mm dot pitch and flicker-free 1280 x 1024 at 75Hz resolution bring your graphics to life as never before.

Users thrive on the ergonomic design; anti-glare, anti-reflection, anti-static screens; and its front-mounted, full-featured digital touch-panel.

These new low-radiation (MPR II-compliant) "green" monitors use only five watts of power when "on" but inactive. That's six times better than even the US EPA's own Energy Star guidelines.

So how did we get so big so fast? Simply by giving you more for less. For more information, call your nearest CTX office.



USA Headquarters 20530 Earlgate Street, Walnut, CA 91789, 909-595-6146, Fax 909-595-6293 Technical Support 1-800-888-2012 BBS 909-594-8973 Southern Region 6624 Jimmy Carter Blvd., Norcross, GA 30071, 404-729-8909, Fax 404-729-8805 Eastern Region 481-A Edward Ross Drive, Elmwood Park, NJ 07407, 201-646-0707, Fax 201-646-1998 Midwestern Region 500 Park Blvd., Ste. 295C, Itasca, IL 60143, 708-285-0202, Fax 708-285-0212 Southwestern Region 1225 E. Crosby Rd., Ste. A21, Carrollton, TX 75006, 214-416-9610, Fax 214-245-7447.







©1994 CTX International, Inc. All brand names are trademarks or registered trademarks of their respective owners.
\*Official 1993 Monitrak U.S. monitor sales research.

#### Overture 1.02

#### Music-Notation Software

PROS: Easy to learn; good output; simple part extraction; easy transition for sequencer users. CONS: Some instability; silly copy-protection scheme. COMPANY: Opcode Systems (415/856-3333). LIST PRICE: \$495.



ITY THE POOR DESIGNERS OF MUSICnotation software. They have to contend with Finale, Coda's 500-pound elephant that dominates the music-notation software business much as Adobe's Photoshop lords it over image manipulation.

Pity also the user, whose needs may fall short of Finale's incredibly complete assortment of tools, famously long learn-



**Tool Time** Overture's tool palettes tear off from the menu bar and can be positioned anywhere.

ing curve, and \$749 list price. The need for a cheaper, easier-to-use program has given rise to several worthy products, including Passport's Encore, Jump Software's ConcertWare, and Finale's younger sibling, Finale Allegro.

Noted for its sequencing software, Opcode Systems enters the midrange fray with Overture, an easy-to-learn notation program with a friendly interface. For those who won't use some of Finale's more esoteric features (harp tablature and four-staff Gregorian chant notation come to mind), Overture will fill a real need. Overture may be especially attractive to educators and users of Opcode's Vision series of sequencers.

Overture is a compositional environment, a software analog of the composer's, orchestrator's, and/or copyist's desktops. And, like the notation programs mentioned above, its strength is the seamless progression from idea to full score to individual musicians' parts.

In Overture you notate and edit using palettes that let you assign note duration, dynamics, accidentals, and other symbols. You tear these palettes off the menu bar and position them anywhere on the screen—a nice feature, because you aren't required to change modes to access those functions as you must do in Finale. Once opened, the palettes remain open instead of vanishing with each tool change. Keyboard shortcuts are well thought out and easy to remember.

#### **Entering and Editing Notes**

The easiest way to enter notes is to play them on your synthesizer in real time, and here Overture excels. Overture captures the MIDI data and converts it to notation. Step entry is equally simple: play a note or chord on your synthesizer, then assign a duration—whole note through thirty-second note—through a button on a palette or with a \mathbb{H}-key (whole notes use the number 1, eighth notes use 8, but thirty-second notes use 5). Finally, Overture allows you to enter notes and chords individually by using the mouse to select a duration, then clicking on the staff to assign the pitch. Most users will find this method too slow.

Overture lets you edit MIDI data using the piano roll/strip chart format familiar to sequencer users—a real boon for those who are making the transition to conventional notation. You can adjust key velocity and pitch bend visually, by using Overture's strip chart. Overture handles quantization well, correcting time errors with half-note-to-sixty-fourth-note sensitivity.

Although Overture imports most MIDI files with ease, I encountered system crashes when importing large files. Assigning more memory seemed to solve the problem, but the Mac's serial port still acted up occasionally.

Ease of input and editing are just half the battle, though; output is the other critical factor. Using the included music font, Overture prints out concert or transposed scores very well. It's easy to extract and output parts for individual musicians.

Overture requires Opcode's OMS, an included MIDI manager that works with or without Apple's MIDI manager. Unfortunately, Opcode has copy-protected Overture, limiting its installations and making it run on a drive named at installation time.

#### The Last Word

How do you choose a notation product in this price range? Think of the most remote musical frontier upon which you're likely to tread, and then determine which product fills the bill. Estimate your learning time, and tailor your purchase to your budget. Overture, showing real polish and promise, is sure to be a contender.

—RICHARD FENNO

### Inspiration 4.1

#### Writing Tool

PROS: Improved keyboard controls, spelling checker, and print control; 15 new symbol libraries; RTF import and export capabilities; can exchange files with Inspiration 4.0 for Windows. CONS: Can't select ruler increments.

COMPANY: Inspiration Software (503/

245-9011). LIST PRICE: \$195.





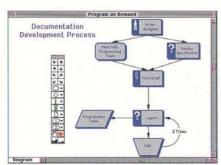
INSPIRATION CLAIMS TO BE a visual way to quickly develop and communicate ideas, and it is. Inspiration lets you easily draw a dia-

gram to represent an idea, process, meeting, or organization, and with one keystroke turn that diagram into a hierarchical outline. Or you can start with an outline, and Inspiration can turn it into a diagram. Whichever order you prefer, Inspiration allows you to move between words and diagrams to show the relationships between ideas.

#### **Picture This**

Inspiration's diagram view lets you select symbols, place them, type your ideas inside of them, and connect related symbols with links. You can add annotated notes to symbols; add text to the links between symbols; or use the simple drawing tools to add lines, boxes, and shapes to the diagram.

Inspiration includes a resizable grid for aligning symbols, automatic arrangement and alignment tools, and rulers for precise measurement (though you can't change the increments on the rulers). The beauty of this system is its flexibility. You can turn off the grid and place symbols wherever you like, or use the Rapid Fire mode, which creates a new symbol every continues



**Diagram View** By placing and linking symbols in Inspiration's diagram view, you can visualize the steps in a process, the structure of an organization, or the facets of a complex idea.

## **Macintosh Training**

Pure.
Simple.
Effective.
Inexpensive.
Award Winning!

he *Macworld Magazine* WORLD CLASS AWARD for training sits in my office. The readers of *Macworld* voted for **MacAcademy** by a margin of 2 to 1 over audio training systems, disk based systems, and all other training companies and products. Simply, we won because our training works! It's affordable, it's flexible, it covers an incredible amount of programs, it's simple to use and it's guaranteed! We won the award because over 250,000 satisfied customers are proof that MacAcademy training programs will work for you. Below please find a current listing of the MacAcademy Video Training Library. Each video is approximately two hours in length and costs only \$49. Each video carries a complete money-back guarantee if not totally satisfied and can be upgraded when software is upgraded for only \$14.95.

\*\*Randy Smith\*\*

40 Dt 1 (X7)
4th Dimension 6 Videos
Canvas 5 Videos
ClarisWorks 6 Videos
Design & Layout 1 Video
Desktop/PrePress 2 Videos
Director 4 Videos
Excel 5 Videos
FileMaker Pro 4 Videos
Mac Fonts 1 Video
FreeHand 4 Videos
HyperCard 3 Videos
Illustrator 4 Videos
Infini-D 2 Videos
Integrate Programs. 1 Video
Lotus 1-2-3 3 Videos
Macintosh 7.X 4 Videos

MacDraw Pro 2 Videos
Mac P & L 3 Videos
MacProject Pro 4 Videos
MacWrite Pro 3 Videos
MS Works 4 Videos
Networking 1 Video
Now Contact/
Now Up-To-Date 1 Video
PageMaker 6 Videos
Peachtree Accntg.3 Videos
Persuasion 2 Videos
Photoshop 6 Videos
PowerBooks 2 Videos
PowerPoint 2 Videos
Premiere 3 Videos
QuarkXPress 3 Videos
Spanish Japanese Corms

Quicken, Personal 2	Videos
Quicken, Business 2	Videos
QuickTime1	Video
SuperPaint3	Videos
Troubleshooting 3	Videos
Word4	Videos
WordPerfect 4	Videos

\$49 each

Live Training Workshops Available in 32 major cities throughout the United States.

Please call for complete schedule and/or on-site corporate training.

Video Training Available in English, Spanish, Japanese, German, & French

Video Training Also Available For Many Windows Programs

Please add \$3 per order along with \$1 per video for shipping and handling.

TOLL FREE ORDER LINE: 800-527-1914 ORDER FAX LINE: 904-677-6717

Checks, PO's, Credit Cards Accepted 48 Hour Delivery 100 E. Granada Blvd., Dept.MW0495,Ormond Beach, FL 32176 "Where the world learns the Macintosh"



time you press the enter key, to brainstorm and let your ideas flow freely without stopping to select and place symbols.

Inspiration 4.1 offers over 450 new symbols (arranged in 15 fully editable libraries), including boxes, signs, fancy borders, and computer symbols. You can create your own symbols in a paint or draw program or import PICT2 graphics. Version 4.1 also offers improved keyboard control over placing symbols on the diagram.

True, you could use a draw program to create circles, boxes, and connecting arrows, but Inspiration does more than draw shapes-it understands the relationships you create between symbols. You can create subdocuments, called children, which are full-featured diagrams that provide further detail about a topic. When you rearrange symbols they stay connected by their links. And version 4.1 allows you to easily insert and delete symbols while maintaining the link structure. You can even create a hidden link between symbols, useful when you don't want to display a physical link between the symbols in your diagram but do want to establish a hierarchical relationship in the outline view.

#### **Outlining Power**

The outline view lets you organize your text in a hierarchy of topics and subtopics. Outlines can have up to 99 levels of subtopics. You can expand and collapse the topics to focus on whatever level needs your attention, without getting overwhelmed by detail. Many word processors and presentation programs offer outlining capabilities, and some are more flexible for large-scale documents, but none offer Inspiration's power. Inspiration lets you write an outline, transform it into a diagram, and add or delete topics and subtopics in either the outline or diagram view.

Version 4.1 adds RTF import and improved RTF export capabilities, so you can import or export outlines. It also adds Houghton-Mifflin's 200,000-word spelling checker (compared with version 4.0's 70,000 words) and enhanced keyboard control over outlining and text editing.

#### The Last Word

Inspiration 4.1 adds improved keyboard control, import and export capability, symbol flexibility, and cross-platform support to an already innovative and effective program. Whether you think better in words or pictures, switching between the two views adds a level of insight to almost any project, making Inspiration a valuable tool for planners and dreamers alike.—LIZA WEIMAN

#### EndNote Plus 2.0

#### Bibliography and Citation Manager

PROS: Enhanced search and change functions; term-list feature aids data entry. CONS: Needs more data entry shortcuts; no horizontal scroll or word wrap in library window.

**COMPANY:** Niles & Associates (510/649-8176). **LIST PRICE:** \$299.

 $MW \star \star \star \star$ 

NDNOTE PLUS 2.0 IS THE LATEST release of Niles & Associates' indispensable tool for harried academics and others who have to keep track of references and bibliographies. You get two versions of the software: a plug-in module that works with Microsoft Word 5.0 and 5.1, and a stand-alone application for use with WordPerfect, WriteNow, MacWrite, FrameMaker, and Nisus. (End-Note does not yet support Word 6.0; registered users will receive a 6.0-compatible

upgrade at no charge when it becomes available.)

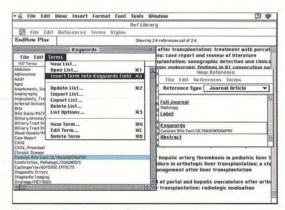
EndNote serves a dual purpose: as a database program it manages collections of reference works, and as a bibliography builder it formats papers that contain reference citations. To use EndNote, you create a reference file, or library, and then plug the required references into your text. EndNote scans your document, inserting properly formatted citations and building a bibliography as it goes. The software ships with predefined formats for more than 200

scholarly publications. If your favorite journals aren't among these (mine weren't), you can create new styles that specify exactly how your citations and bibliography entries should appear.

In previous versions, EndNote's database-management functions were not as comprehensive as they might have been, so I was pleased to see that they've been enhanced considerably. The Find function now lets you search for empty fields and for fields that fall within a specified range of values (say, 1988 through 1995). Version 2.0 also gives you more control over the way the program displays reference lists. Two new commands allow you to include or exclude selected items from a list, and you can now choose the font and size of the display type. (Alas, my previous complaints about the lack of a horizontal scroll bar or an automatic wordwrap feature in the Library List window still haven't been addressed.)

EndNote has two other welcome additions. The new Change Text command allows you to replace one text string with another throughout a database, and the Change Field command lets you replace a field, clear a field, or append text to a field, no matter what its contents. Version 2.0 also sports beefed-up import and export capabilities. For instance, you can now merge two databases by importing one library into another, and a new option weeds out duplicate references when you're importing. (For \$99, you can buy a separate product called EndLink that imports references from online services and CD-ROMs.)

Another new feature lets you create lists of terms you can refer to when adding new references to a library. Term lists can contain author names, journal titles, keywords, or any items whose usage you want to keep consistent. You can link a term list to a specific field, so that the proper list appears when you enter data. Unfortunately, you have to open a term list to



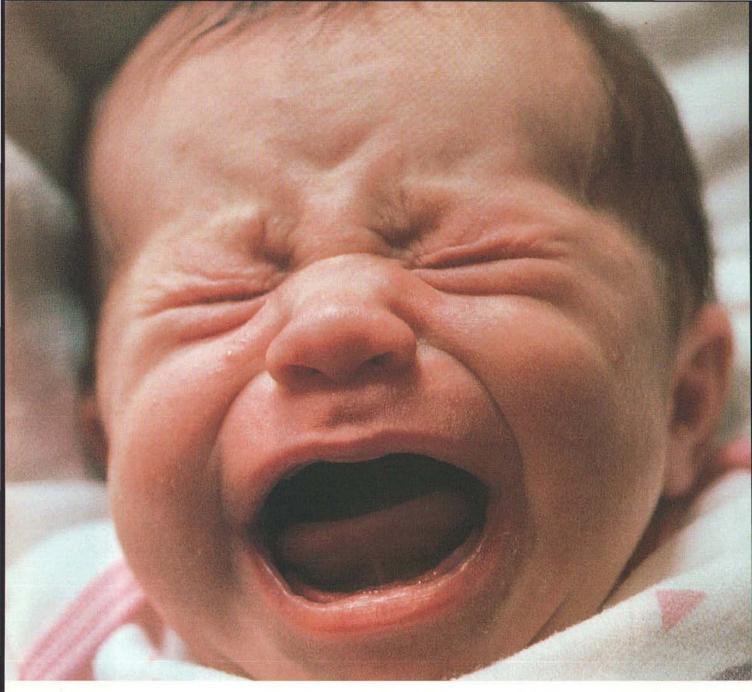
**Reference Terms** Term lists can save you keystrokes and help prevent errors when you're entering data into an EndNote library.

use it; I'd like to see an option that automatically inserts a term as soon as your typed entry matches an item from the list. Automatic text formatting—word capitalization, for example—would be another handy feature.

Despite its power, EndNote Plus 2.0 remains surprisingly easy to learn and use. The revamped manual runs over 400 pages, but it's thoughtfully organized and includes a wealth of helpful tips. Niles & Associates offers technical advice by phone, and it also maintains a support forum on America Online.

#### The Last Word

EndNote Plus 2.0 is an example of an excellent product that's grown more powerful over the years. If you have to work with citations and bibliographies, I recommend it highly.—FRANKLIN N. TESSLER



## "But They Said My New Macintosh Would Run Windows Applications."

It's a crying shame. You thought your new Mac could run Windows applications right out of the box, but it doesn't. Well, dry your eyes, because even though they forgot to sell you the software you need, you're not out of luck. Just get SoftWindows.

SoftWindows lets you run the standard mode Windows applications you need at work or at home. With a couple of clicks, you can access databases in dBase. Edit spreadsheets from Excel or Lotus 1-2-3. Exchange documents, presentations, even access your company's e-mail, printers and networks.



Over 150,000 Mac, Power Mac and Performa users already run Windows applications with SoftWindows. So can you. Just look for our "Try-It" CD-ROM at your favorite retailer to test drive SoftWindows on your Mac. You'll see. It's as easy as taking candy from a baby.

See your local dealer or call 1-800-848-7677.



Run Windows On Mac



#### Read-It O.C.R. Pro 5.0

#### Optical Character Recognition Software

**PROS:** Instant OCR with Read A.S.A.P.; good block identification; good documentation.

CONS: Reading accuracy varies severely from font to font. COMPANY: Olduvai Corporation (305/670-1112). LIST PRICE: \$395.



ENERAL-PURPOSE, ACCURATE OPTIcal character recognition of printed text remains—I am sorry to report after following the OCR field for almost 15 years—something of a software challenge. Read-It O.C.R. Pro 5.0, for example, features an excellent Macintosh interface, includes the only drag-and-drop OCR facility on the market, reads several spe-

cific kinds of text at nearly 100 percent accuracy, and correctly interprets bold and italic within a given font family. Yet, on plain-vanilla 10-point Times Roman printed at 2750 dpi, and on other more difficult image files in the standard *Macworld* test suite, Read-It is capable of producing text that contains long strings of unusable hash.

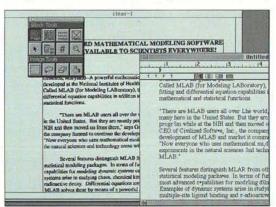
Some aspects of the program are baffling. Given that Read-It processes the scanned text through a spelling checker, I simply don't understand how it (or any other OCR program, for that matter) can produce files containing misread-

ings of many of the 20 most-common words in English (see "all over Lhe world"). No program should offer, as Read-It O.C.R. did, th3t instead of that, or theg for they. While I don't necessarily expect any optical character recognition program to get chiropodist, based on English-language probabilistic models there's not much excuse for Read-It to see in as im throughout a page. The situation is enough to remind one of the low comedy attending the introduction of the first Newton software.

There are other anomalies here as well. Most OCR programs offer disastrously worse reading performance on fuzzy printed-out faxes than on cleanly printed text; in contrast, Read-It O.C.R.'s accuracy is in the low 90 percent range on clean text and bad faxes alike. (Competing programs produce accuracies on clean text in the high 90 percent range.)

The exception to this rule seems to be that Read-It reads text in Courier and a whole family of typewriter-like fonts with strong serifs quite accurately, with no errors in three or four pages. This suggests to me that the recognition algorithms don't have enough statistical feature data to work with on, for example, Geneva or Helvetica. Perhaps this is also why Read-It is decidedly skew-sensitive—if you line up a sample in a flatbed scanner and the edge is off by a few degrees, Read-It will often have severe reading problems.

Nonetheless, this program has attractive features, especially if you're scanning typed material on its favorite scanners (Apple and Hewlett-Packard). It converts image files to text when you simply drag the image files over the Read A.S.A.P. icon, it's easy to set up for batch mode, it



**all over Lhe world** Why a modern OCR program would report such words as *Lhe* (read here by Olduvai's Read-It O.C.R. Pro 5.0) or *tne* or *tlne* is one of the last remaining mysteries in probabilistic analysis of text.

flows text directly into word processor files, it's unfazed by font and style changes in a document, and in all test documents it correctly zoned the text blocks. Its word-verification pop-up is nicely implemented, too—the problem is that it pops up all too often. The framework of an outstanding OCR program is here, but Olduvai has to convince the program that under no circumstances should it offer thinp as a possible reading of any text in English, no matter what.

#### The Last Word

Read-It O.C.R. 5.0 has a nice assortment of convenience features, but its recognition engine, although improved over earlier versions, isn't up to the standards set by Xerox's TextBridge or Caere's Omni-Page. It's not a first choice unless you simply need to process piles of very clear Courier text.—CHARLES SEITER

### Special Delivery

#### Multimedia Authoring Tool

PROS: Easy to learn; not hardware-hungry.

CONS: Not as flexible as other authoring tools; can be confusing; expensive. COMPANY:
Interactive Media Corporation (415/948-0745).

LIST PRICE: \$399.

MW \*\*

PECIAL DELIVERY 2.0 IS A MULTImedia authoring tool that falls between industrial-strength authoring programs, like Macromedia's Director, and presentation-graphics programs like Adobe's Persuasion. Special Delivery can't create bullet charts as easily as Persuasion does, and it's not as flexible or powerful as Director. It's for use with documents more complex than a slide show but less interactive than, say, Myst.

At first glance, Special Delivery's slide-show metaphor is similar to that of other presentation programs. The Layout view shows each slide as it will appear to the user. Text, graphics, video clips, and buttons are stored in geometric regions called portals. The Tools palette includes a text tool and simple drawing tools, although it isn't a full-featured graphics editor. Special Delivery can import a variety of media types, and it comes with a library of clip media.

The first slide is a map, which is similar to the slide-sorter view in other presentation programs. But because Special Delivery aims to transcend the linear slide-show model, rearranging slides is more difficult than in other programs.

The slide-show metaphor breaks down when you switch to Button View, where you add interactivity. In Button View, portals are visible only as colored outlines. Labeled arrows link portals to show interactivity. Button View is like looking under the playfield of a pinball machine; you see the circuitry that causes things to happen. For a simple interactive presentation, Button View can be enlightening. For a complex hypermedia document with lots of linked objects and complicated logic, the maze of arrows is intimidating. The developers tried to make this view more intuitive by having the program automatically create labels identifying what each arrow does. Unfortunately, labels like "1. BdHM.5 Show" don't make complex structures simple.

Creating an interactive link is easy for buttons that perform common operations: draw a link and choose the menu continues

# We put our money where our mouth is.



hen it comes to memory,
we back your Mac. In fact with our
new Lifetime Replacement & Service Warranty, we
back it like nobody else. We were the first with a lifetime
warranty on all our memory products, and now we're the only
memory manufacturer to offer dealer service reimbursement.
That means if your dealer has to send a service technician to
you because a Viking memory product fails, we'll not only
replace the part for free, but we will reimburse\* your dealer for
the service call!

How can we afford to have a policy like this, you ask? The reason is confidence--very few Viking memory components ever fail. Our

reliability for quality and compatibility is unsurpassed. We manufacture our

own products in-house under the strictest quality control. We are absolutely committed to excellence in product quality, customer satisfaction, and in setting warranty policies that make our customers' lives a little easier.

Make your life a little easier. The next time you add memory to your Mac, buy the bytes with some teeth in them. Insist on Viking Components. From sales to service, you really can't afford to settle for anything else. Call us for the dealer nearest you.

## VIKING

11 Columbia • Laguna Hills, CA 92656 Tel: 714-643-7255 • Fax: 714 643-7250

Customer Support: 1-800-643-3255 · Sales: 1-800-338-2361

\*Subject to Viking approval. Some restrictions.

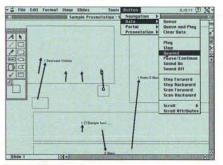
Manufacturing tomorrow's products. . . Today!

#### Reviews

item that tells the arrow what to do. The Button menu offers more than 50 commands, including navigation controls (Next Slide, Open Application), data controls (Play, Scroll), portal controls (Show, Condition Enable), and presentation controls (Hide Cursor, Increase Volume).

You can customize buttons via dialog boxes. Several additions to version 2 make buttons more versatile. For example, you can now program a button to respond only after another button has been clicked, or after a time delay, or to perform a different function the second or third time it's clicked.

How effective is Special Delivery's unusual multiview interface in real-world authoring? As a test, students in my interactive multimedia class at Oregon State University built a prototype for an interactive tutorial. The students (Mark Dinsmore, Hector Hernandez, and Brian Maillard) agreed that Special Delivery was easy to learn and use once they adjusted to its interface. But they ran up against limitations in the program when they tried to add features like an intelligent backtracking button. The students also reported occasional inconsistent responses and sporadic system crashes. While I wasn't able to replicate these in smaller test projects, I did find more glitches than I'd expect in version 2 of a product.



**The Inner Workings** In Button View, arrows show how buttons control the video clip (left) and make the picture and text blocks appear.

#### The Last Word

For large projects that include hypertext, frequent backtracking, or anything else out of the ordinary, Special Delivery isn't your best choice. Still, it might save hours or days of training for users who need to create simple, professional-looking interactive presentations combining text, graphics, video, and sound.

If you're hesitant to spend \$399, the company's \$24.95 (plus \$4 S/H) Interactive Multimedia CD-ROM contains a trial version of the program, a thorough set of interactive lessons for learning it, and other materials. This CD should help you decide whether Special Delivery is worth signing for.—GEORGE BEEKMAN

#### mPower 2.0

#### Multimedia Authoring Program

PROS: Provides an easy-to-learn approach to media integration; supports a wide range of file formats and media sources. CONS: Awkward, button-intensive interface; limited transitional and animated effects. COMPANY: Multimedia Design Corporation (704/523-9493). LIST PRICE: \$295.

MW ★★

POWER IS AN ENTRY-LEVEL multimedia authoring program that sets out to make the creation of interactive presentations as simple as possible. Toward that end, the program dispenses with the usual array of menus, submenus, time lines, and dialog boxes that you find in most authoring tools. Instead, mPower offers a push-button interface that is similar to a bank ATM.

The program's slick-looking main interface consists of a small window where you view your presentation in progress and a column of 3-D-style buttons with functions that change depending on your location in the program. This approach makes mPower easy to learn and understand; you accomplish virtually every task involved with assembling a presentation-creating slides; selecting backgrounds; adding text, graphics, video, and sound; applying transitional effectsby clicking on the clearly labeled buttons on screen. Unfortunately, clicking on button after button also makes authoring cumbersome and time-consuming.

To illustrate: Suppose you want to create a new slide containing a text object. First you click on the Add New Slide button, then the Text button, then the Add New Text Button. Now you can actually type the text on the slide, but to change the font you must click on the Font button. This produces a dialog box containing eight standard fonts; if you want to use some other font, you must then click on the Other Font button to get a list of all installed fonts. Setting other text characteristics-color, style, size, and so oninvolves more buttons. When you've formatted the text, you have to click on the Done with Text button before you can

All this button clicking makes the interface a bit claustrophobic. The feeling is intensified by the fact that you're forced to view your slides in the tiny Object Window at a reduced size. True, you can preview slides at full size, but in full-size view, you have no access to any

of the editing buttons. The program provides no other viewing options; you can't zoom in or out when editing a slide.

While mPower may lack the hidden menus, submenus, and dialog boxes that complicate other programs, it also lacks a real arsenal of authoring tools. Drawing tools are minimal and clumsy. Likewise, slide-to-slide transitional effects lack variety. You can make objects enter and exit on cue—but only along eight predefined, uneditable paths. You also can make objects fade in or out, but I found that fade transitions produce jerky, halting results on a Quadra 630.

One of mPower's strengths is the broad range of media it allows you to integrate into presentations. You can import graphics in PICT, PCX, Photo CD, and EPS formats; audio directly from compact discs or in AIFF and snd formats; and QuickTime movies and other video digitized from a VCR or camcorder. The



**Button Up** With mPower's ATM-like interface, every command is a button-click away. The current slide in the presentation is displayed in the window on the left, and access to editing tools is provided through the column of buttons on the right.

program's A/V controller supports a variety of Sony and Pioneer laser-disc players, too, along with any serially controllable analog media sources, such as high-end VCRs.

The program also offers some good tools for adding interactivity to a presentation. You can set up buttons on slides that let viewers control the flow of a presentation, play sounds, show QuickTime movies, move the viewer to any other slide in the presentation, or launch another application.

#### The Last Word

Despite a handful of sophisticated multimedia features, mPower is too limited to be a compelling authoring tool. And while its push-button interface is easy to grasp, it's far too cumbersome. It simply takes too long to navigate the program. In the end there are programs, such as Gold Disk's Astound and Macromedia's Action, that provide a far better entry-level approach to multimedia.—JOSEPH SCHORR

## **RasterOps** performs GT versus competing products such as the Radius LeMans GT, with the most popular page layout and graphic design applications. We found that, across the board, Prism GT outperformed the competition." Jon Peddie, of Jon Peddie Associates, a leading independent graphics consulting firm RasterOps' new 24-bit PaintBoard Prism family is the perfect match for the graphic design power that Apple's new Call I-800-SAY-COLOR PowerMacs are providing. But don't take our word for it; listen RASTEROES to what the experts are saying... TRUEVISION°

#### RescueTxt 1.0

#### **Text Utility**

**PROS:** Fast, accurate; virtually foolproof performance. **CONS:** Does not display file names; displays only one match at a time; cannot search more than one disk at a time.

COMPANY: Abbott Systems (914/747-3116). LIST PRICE: \$79.





THE WORST HAS HAPPENED. You've accidentally trashed a valuable file that contains important information you need. Or you've forgotten which file

contains the text you need. Abbott Systems' RescueTxt is designed to help you solve both problems.

RescueTxt searches all of your hard drives for the presence of any text string. Unlike other utilities that search for text, RescueTxt reads the disk directly, block by block—so it can actually seek out text in files you've already deleted, provided nothing has written over the deleted file. I had RescueTxt search for text in a number of documents, some recently deleted, and it was consistently success-

ful in finding the correct search strings.

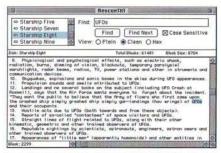
Unfortunately, even when you locate the text in a file that isn't deleted, RescueTxt doesn't tell you the file's name, so you cannot simply open it. Your only option is to cut and paste the text into a new document. Thus you lose any format information contained in the original file.

Rescue Txt is simple to use. You launch the application (which is native for the Power Macintosh and compatible with 680X0 Macs), enter your search string, choose whether the search string is case sensitive, then select the drive you want to search, and click on the Find button. If the item that matches your search string isn't the one you want, you click on the Find Again button to continue the search where it left off. The program is quite speedy. But its modal (nonmovable) dialog box prevents you from doing anything else on your Mac while the search is progressing.

If you want to search for text in a document, other programs display the name of the file that contains the text-string match and (in some cases) launch the file in the program that created it. Some examples are Now Software's Now SuperBoomerang (part of the Now Utilities collection), Gopher (which comes with PrairieSoft's Disk-Top), and even the new System 7.5 Find File application. There are others, including some shareware. But these programs

will not locate text in a file you've already deleted. For that, you can use Central Point Software's MacTools Pro and Norton Utilities (the latter will also search for text strings in files not deleted).

None of these programs, however, perform quite as speedily as RescueTxt.



**How Do I Find Thee?** Use RescueTxt to locate missing text on your hard drive, even if you've already trashed the file.

The Last Word Yes, RescueTxt is a one-trick pony. But if you want decent performance and the ability to locate text in even a deleted file, RescueTxt is worth consideration, if only as an additional tool in your utility arsenal. RescueTxt makes a trade-off between speed and retaining the file name: the lack of file names is frustrating, but the speed is ultimately worth it.

—GENE STEINBERG

#### MLab

#### Mathematical-Modeling Software

PROS: Excellent facilities for producing differential-equation models of systems; special accommodation of nonlinear dynamical systems. CONS: Smaller graphics repertoire than Mathematica; austere interface.

COMPANY: Civilized Software (301/652-4714). LIST PRICE: \$1495.

MW ★★★★

HE MATH PROGRAM MLAB IS short on Mac amenities but is quite powerful for a large range of science applications. This includes any activities in which the expected behavior model of the underlying physical, chemical, or biological system is an ordinary differential equation or system of equations. That's a big range. In fact, MLab is more than a match for Prescience's Theorist, a middleweight symbolic-math package; moreover, in its own domain MLab shows several advantages over Wolfram Research's Mathematica.

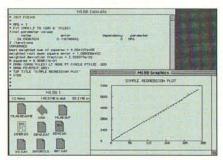
MLab, which was developed at the National Institutes of Health, is not a general-purpose math program. It's essentially a programming language, drawing on constructs from Pascal, FORTRAN, and BASIC, that implements a large assortment of commands for fitting experimental data to dynamical (usually differential-equation) models. MLab also covers statistics (descriptive, cluster-analysis, and survival-analysis), fast-matrix algebra, and an assortment of graphs oriented toward presentation in scientific journals.

By Mac software-interface standards, MLab is pretty primitive-its Unix and DOS origins make it a good choice for researchers familiar with text-based command-line programming. At start-up MLab displays a blank Console window with no horizontal-scrolling or sizing capabilities. The File menu doesn't even include old favorite commands such as Open. The program requires a 68020 or higher processor and hardware math coprocessor (the on-CPU hardware math in the Quadra 650, 800, and 950 works), and it doesn't yet come in a Power Mac version. However, it can function in less than 2MB of free RAM, making it the least-demanding high-powered science application for the Mac.

The payoff in MLab, compared with other scientific software, lies in the large number of carefully explained, easy-to-program examples included in its truly superior documentation. The tutorials on enzyme kinetics, multicompartmental pharmacological models, pulsed magnetic-resonance

spectroscopy, nonlinear oscillators, and nearly 30 other scientific topics are clear and full of practical examples. In principle, you could do this sort of modeling in Mathematica or many other packages with well-designed floating-point numerics. The difference is that MLab tells you explicitly how to do it, with instructions written by scientists for scientists.

The Last Word MLab lets you do fast computation on numerically complex real-world problems, using only an ancient Mac II or higher. You must be willing to write short (usually single-page) programs, but MLab will reward the professional researcher with its mathematical-modeling capabilities.—CHARLES SEITER



**Plain in the Plane** Although the program supports contour and surface 3-D plots, the typical MLab plot is simply a 2-D publication-ready blackand-white line graphic like this regression sample.

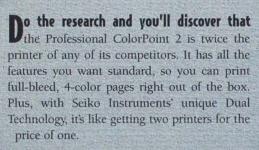
## Before you buy a color printer, you'd better double-check your facts.

STANDARD FEATURES

PROFESSIONAL COLORPOINTZ MODEL 4/14

TEKTRONIX PHASER 440/480

DUALTECHNOLOGY	<b>V</b>	
ADORE POSTSCRIPT LEVEL 2	<b>√</b>	1
33 MHZ RISC PROCESSOR	/	
135 ADOBE TYPE 1 FONTS	/	
	<b>/</b>	
AUTO TRIM (Automatically cuts paper/OHP)		
INTERNAL HARD DISK	/	
(No additional RAM needed)		
4-COLOR FULL-BLEED PRINTING (Right out of the box!)	/	
(Right out of the box!)		
INDUSTRY-STANDARD	/	
COLOR MANAGEMENT		
DCS FILESUPPORT	/	



Dual Technology means the Professional ColorPoint 2 can output both thermal wax transfer and dye sublimation prints. Use the thermal wax transfer mode to output inexpensive ad, collateral, and packaging comps, or rough drafts of brochures and presentations. Then

switch to dye sublimation mode when you're ready to print high-quality, photorealistic final output. So instead of being tied to the higher cost of materials with a dye sub-only printer, you'll save thousands of dollars on supplies by using thermal wax transfer during your proofing stages.

Check it out for yourself. For free sample output and a brochure on how the Professional ColorPoint 2's Dual Technology can save you up to forty thousand dollars a year in output

costs, or for a free demonstration, call **800-888-0817**.

SII Seiko Instruments

Circle 93 on reader service card

#### NetWorks 3.0.4

#### Network-Monitoring Utility

PROS: Easy to use; many options for monitoring and notification. CONS: Expensive for small installations. COMPANY: Caravelle Networks Corporation (613/225-1172). LIST PRICE: 25-device license \$1395, 100-device license \$2495, larger site licenses available.



F YOU ARE A NETWORK MANAGER who dreams of becoming omniscient, NetWorks is for you. This easy-to-use software continually polls devices-CPUs, printers, routers, hubs-over AppleTalk, DECnet, IPX, and Unix networks, checking them for signs of life. It can also monitor network zones and services running on file servers (such as an E-mail system). It offers a multitude of configuration and reporting options and runs neatly in the background of the net manager's Mac.

A concise device list reports back on the devices you choose to have tested, indicating whether a device is down, up, on hold, or waiting to be tested. This list also provides detailed device information, such as traffic statistics from a router.

Devices equipped with SNMP permit enhanced reporting such as network-traffic speed (in bits per second) and system performance. NetWorks recognizes SNMP agents included with many hardware devices, such as routers and network hubs. Caravelle's own SNMP responder is for use on CPUs. This is useful for file servers and Macs running critical network services, such as remote access. A control panel lets you check hard drive statistics of any Mac, including available disk space.

Send Up a Flare When something goes wrong on the network, say, a server goes down or is inexplicably slow, Net-Works can notify you via on-screen messages, E-mail, messages sent over a pager or forwarded to an online service, or spoken via MacinTalk (not compatible with System 7). Alerts are customizable and can include the device name, the device type, the device's network location (zone name), and even network-node numbers and Internet addresses.

When you set up NetWorks, filters help you select particular zones or specific devices, such as printers or routers. I installed NetWorks on my Quadra 650 and, from a list of available devices on my company network, selected 25 devices that are critical to the smooth operation of the network. In about 35 seconds NetWorks monitored all 25 devices and reported back on



Virtual Network Viewing NetWorks' Device List shows you at a glance any trouble on your net.

their status. After I intentionally shut down a printer, in seconds NetWorks reported the failure to me via desktop notification (E-mail and pager options take from a few seconds to a few minutes longer, depending on your E-mail system and paging network). I also verified disk-capacity data, and I shut down several systems and E-mail services on monitored systems. NetWorks was speedy and accurate.

The Last Word If the network you maintain is small-say, ten or fewer critical devices, all located within your building-NetWorks is not a cost-effective choice. But for networks that sprawl across several buildings or even several states, it's a net manager's indispensable tool.—MATT CLARK

#### RemotePoint

#### **Cordless Pointing Device**

PROS: Easy to hold; doesn't require precise aiming. CONS: Cumbersome for dragging; battery-compartment cover hard to fasten. COMPANY: InterLink Electronics (805/484-

1331). LIST PRICE: \$199.



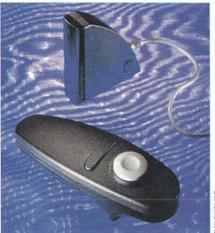
ORDED MICE AND TRACKBALLS ARE fine for desktop pointing and clicking, but they fall short for doing stand-up presentations, when cables just get in the way. The RemotePoint, a new infrared pointing device from InterLink Electronics, offers a novel solution for Macintosh users who don't want to be tied down.

Sporting a contoured look that resembles a Star Trek hand phaser, the Remote-Point is designed to suit either right- or lefthanded users. When you grip the RemotePoint, your index finger rests on a forward-facing button that is functionally identical to a standard mouse button. (Another button on the upper surface serves the same purpose.) A disk on top of the RemotePoint controls the cursor. The cursor's movement corresponds to the area of the disk you've pressed; press harder and the cursor moves faster.

The RemotePoint communicates with the Mac via a compact infrared sensor that plugs into the Mac's ADB port. Although the manual recommends placing the sensor anywhere that guarantees an unbroken line of sight, I found the RemotePoint more forgiving than some other infrared devices I've tried; cursor response remained smooth even with the RemotePoint aimed off to one side of the sensor. It works at distances of up to 40 feet.

Two AAA batteries (included) provide power for the RemotePoint; according to InterLink, the batteries should last about one year. Inserting the batteries turned out to be the only sore spot-the two tabs that hold down the battery-compartment cover bend easily, making it impossible to snap the cover into place until you pry them back into position.

If you've already grown accustomed to a mouse or to a trackball, becoming proficient with the RemotePoint takes some practice. Until you learn to control the degree of pressure you apply to the disk, it's easy to overshoot your target on the monitor. Even with experience, though, some operations remain more cumbersome than they are using a desktop pointing device. For instance, it's harder to draw curves with the RemotePoint than with a standard



mouse, largely because your thumb isn't designed for circular movements. Dragging is also more awkward with the Remote-Point, because it's hard to press the button and manipulate the disk at the same time. InterLink should consider adding a dedicated click-lock button, or at least let you configure one button to lock using controlpanel software.

The Last Word Although it's not my first choice for desktop work, the RemotePoint is an elegant workaround for people who don't want to (or can't) be tethered to their Macs .- FRANKLIN N. TESSLER

Feel the flexibility with dozens of

new plug-in tools and palettes. Even use existing Illustrator plug-ins right within FreeHand!

# Feel The Power For Only \$149.

Upgrade to the power of FreeHand 5:

The Eddy Award-winning Drawing Program is

Feel the power of page layout with text style sheets, spelling checker, columns, search & replace, copyfitting, linked text blocks, even multi-page support!

> Feel the precision of "snap-to" grids, guides, and points-plus magnification of up to 25,600% on a massive 22' x 22' pasteboard!

*New* FreeHand 5

Feel the possibilities of special effects like Fisheye Lens, 3-D Rotation, Multi-color gradients, Calligraphy Pen, even Drag 'n Drop color!

The editors of MacUser felt it. And now you can feel it too. The ultimate power and unlimited freedom in design and illustration, in new Power Macintosh native FreeHand 5. All for only \$149. We'll prove it.

On our free Showcase CD, you'll see what the power of FreeHand can do for artists, designers, illustrators, desktop publishers and multimedia mavens just like you.

WYSIWYG preview mode-faster than Illustrator and all the others!

Feel the speed of working in the fastest

So call for the FREE CD. Or upgrade for only \$149. And feel the power of FreeHand 5 for yourself.

> FREE SHOWCASE CD-ROM 1-800-326-2128

> > ASK FOR OPERATOR #714

## MACROMEDIA

now available to current FreeHand users and users of Illustrator, Canvas and MacDraw\*\* for only \$149. Call 1-800-989-3762 today!











Circle 86 on reader service card

#### **MMS557**

#### Multimedia Speaker System

PROS: Clean, natural sound; decent bass; fast hookup. CONS: Lacks separate connection for external CD-ROM's audio jacks; sound gets a bit harsh if you play it too loud. COMPANY: Audio-Technica USA (216/686-2600). LIST PRICE: \$149.95.



UDIO-TECHNICA'S NEW MULTI-media loudspeaker system demonstrates that good things can come in small packages and at modest prices. The MMS557 active two-way multimedia speaker system consists of two solidly built units, each 9 inches high and 5½ inches wide. The right speaker, which contains the amplifier, has volume, bass, and treble controls and an on/off switch. Audio-Technica provides black metal desktop stands to raise the speakers a couple of inches. The package is rounded out by speaker and input cables and an external power supply that plugs into an AC wall jack.

The Audio-Technica MMS557 employs a basically straightforward design, not unlike many conventional speakers. The

tweeters are diminutive, just ¾ inch in diameter, and they reproduce the midrange and high frequencies. A 4-inch bass reflex woofer (using a hollow tube or port to enhance bass response) handles the low frequencies. The internal stereo amplifier is rated at 20 watts total power. Audio-Technica doesn't say what rating method it uses (the audio industry uses several), but the rating means that the system produces a reasonable amount of undistorted sound, probably as much as anyone needs outside of a regular stereo system. Frequency response is rated at 80Hz to 20,000Hz, but no response variation is specified.

The proof is in the listening, though, and there the Audio-Technica speakers acquit themselves well. They produce midrange and high frequencies with a clear, well-balanced sound one doesn't expect in speakers in this price range. There's even a decent amount of bass to add heft to the sounds of games such as Myst and your favorite music CDs.

The speakers don't break the laws of physics, however; if you turn up the volume too far, the sound gets a trifle harsh, and turning up the bass tone too high makes the low frequencies a bit muddy. At normal volume levels the speakers can't quite plumb the lowest depths of the frequency spectrum, a deficiency to be expected. But used within a comfortable listening range, there



is little to fault in these speakers' sound.

My other quibbles are few. The manual doesn't tell you which RCA phone plug to hook to which channel on the speaker (the convention is red for the right channel, white for the left). And there isn't a separate input jack for the audio output from an external CD player, forcing you to scurry to the nearest Radio Shack for adapter cables. I could also wish for a subwoofer to provide more oomph in the bass region.

The Last Word Among a huge selection of similarly performing speaker systems, Audio-Technica's MMS557 stands out as a best buy in its class. The speakers look good, but more important, they sound good, and are a worthwhile addition to any multimedia setup.—GENE STEINBERG

## PaperPower 1.0

#### Graphics Tablet Utility

PROS: Adds versatility to graphics tablets; provides good macro-building tools. CONS: Overlay functions can get in your way. COMPANY: Piptel (513/294-6656). LIST PRICE: \$149.



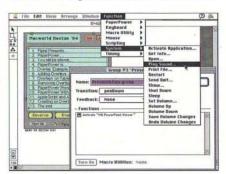
F YOU USE A GRAPHICS TABLET, PAPER-Power lets you create customized paper overlays that reduce your reliance on the keyboard and mouse and make your tablet a control center for presentations. But don't throw away your mouse yet.

Essentially, PaperPower lets you build and execute macros—short programs you can use to automate operating-system commands or application-program functions. First you design an overlay in which macros are organized as Keys (tablet areas that work like HyperCard buttons). Then the overlay is assigned a unique pattern of dots (called pips). This allows PaperPower to catalog and recognize different overlays. Finally, you print the overlay—this is where the paper comes in—and place it on the tablet surface, where the overlay identifies the Keys, making them accessible with a touch.

PaperPower treats an overlay as an extra layer of the tablet, with a background layer. The background layer is reserved for normal tablet operation, letting you use the tablet for drawing. You can switch between the overlay and background layers. You can also use multiple overlays at the same time.

You design overlays in PaperKeys, a separate program with tools for creating Key objects. You attach macros to Key objects by selecting functions from pop-up menus. The program offers an array of macro functions and can incorporate scripts built with the QuicKeys and Tempo macrobuilding programs.

However, PaperPower is not a panacea for the mousephobic. Even the most con-



**Laying Over** PaperPower builds macros, assigns them to tablet areas, and prints out paper overlays, letting you control functions right from your tablet.

firmed tablet users should expect to turn regularly to mouse and keyboard. Constructing the perfect overlay requires quite a bit of work—even if you only select macros from the pop-up menus.

Veterans of macro-building utilities should have little trouble using PaperPower, but novices will need to play around with it before they can build useful overlays. Beginners will find the manual hard to digest. The intro sections simplify some concepts beyond recognition, while the more technical sections can get a little dense.

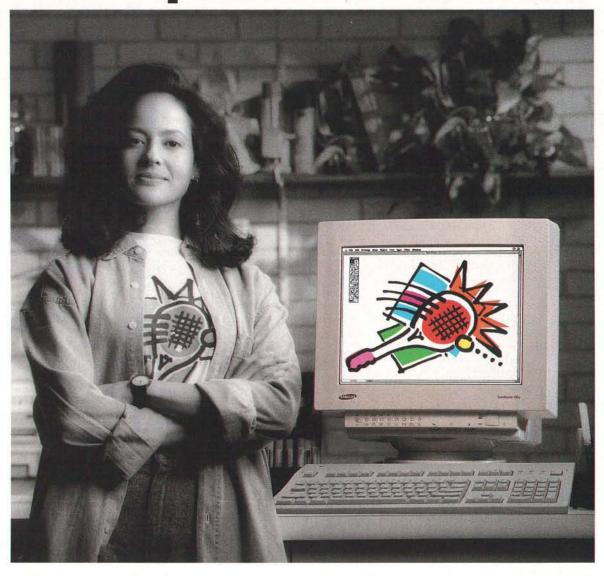
If you have more than one active overlay, or forget to switch to the background layer, the overlays can interfere with cursor movements while you use the stylus. Worse, stumbling on a Key can inadvertently trip another function, such as launching a program. PaperPower demands awareness—of where you are on the tablet, which overlay is active, and so on—and adjustment.

Consolidating functions for controlling your presentations is probably PaperPower's best application. It's too bad that the package doesn't include basic overlays for popular programs.

The Last Word On balance, Paper-Power gives life to an interesting idea and provides a useful tool for creating and using macros, but I don't think I'm quite ready to give up my mouse and keyboard.

—CARLOS DOMINGO MARTINEZ

## Samsung. Mac's new point of view.



## SyncMaster 17GLs

It's about how you work on your Mac. Attitude. Satisfaction. Pride. Samsung designed the SyncMaster™ GL Series to be an extension of your creativity.

Whether you design on a Quadra workstation, create multimedia presentations on a Power Macintosh or need external video for your PowerBook, the Sync/Master Gl. Series will improve the way you view your work.

SyncMaster	14GL	15GL	17GL	17GLs
CRT Size	14"	15"	17"	17"
Dot Pitch	.28	.28	.28	.26
Maximum Resolution	1024×768	1024 x 768	1024 x 768	1152 x 870
Maximum Refresh Rate at Maximum Res. (Hz)	75	75	75	75
MPR-II (Low Radiation)				•
Power Management			•	
Flat Square Screen				
On-Screen Programming				
Real Color Control				
Warranty	2 Years	2 Years	2 Years	2 Years

\*1994 Samsung Electronics America Inc. Image on SyncMaster 17GLs countery of Mike Ouron Design Office. Adaptor required for Macintosh Compatibility. Macintosh is a registered tradiena and PowerBook, Power Macintosh, and Quadra are trademarks of Apple Computer, Inc. With true 24-bit color, multiple on-the-fly resolutions and on-board color control, you can easily concentrate on what you're doing — not on what's running it.

Think about how you work on your Mac.

Samsung did. And came up with a whole new point of view.

For more product information, call 1-800-933-4110.

Now available at MacMall.



To order direct call 1-800-222-2808.

## Widget Workshop

#### Wacky Science Simulation

PROS: Intellectually stimulating, never boring.
CONS: Takes a while to learn; may leave
you wanting more. COMPANY: Maxis Software
(510/254-9700). LIST PRICE: \$44.95.



CAN HONESTLY SAY THAT THIS PROgram is one of the coolest pieces of software I have ever used."

"Totally awesome!"

Normally our handpicked crew of software testers reserves this kind of praise for games. But they're talking here about Widget Workshop, a fiendishly clever sciencesimulation kit from Maxis. Educational software that's fun—now that's cool.

Widget Workshop is a mad scientist's laboratory that allows you to build Rube Goldberg-style widgets out of tools like switches, light bulbs, metronomes, counters, speakers, and hearts. Hearts? No, this isn't Mortal Kombat III. The hearts are strictly clinical and mercifully bloodless; they're included so you can, for example, compare the heart rates of different species.

The widget-building process is simple:

you use the pointer to drag tools from the tool tray onto the work area and link them so each tool's output connectors are connected to the input connectors of other tools. When everything is connected, you test your creation by clicking on the Go button.

Double-clicking on a tool brings up a dialog box that briefly describes the tool's function, suggests possible uses, and offers options for customization. For example, the gravity chamber allows you to control not just the type of object you drop, but the amount of gravity.

When you first enter the workshop you'll need some help figuring out what the iconlike tools do and how you put them together. An entertaining Mad Scientist's Guide (one of two excellent manuals) leads you through a series of projects to familiarize you with the program. It quickly moves from simple experiments to complex simulations involving Boolean algebra and computer logic gates—perhaps a bit too fast for some users. Even though the package recommends Widget Workshop for ages 8 and above, users at the young end of that scale may need help with many activities.

The package includes several puzzles not-quite-finished widgets that serve as brainteasers—and a bag of plastic tools and toys for experiments that combine the physical world with the widget world. Still, users may eventually wish for more—more work space, more tools, more options for each tool. Widget Workshop encourages imagination and exploration, and that inevitably leads into corners that the programmers didn't anticipate.

The Last Word Widget Workshop is so good that it's worth the minor disappointment that results from running up against the workshop walls. Perhaps future versions will be enhanced and extended; maybe they'll even allow plug-in additions. In the meantime, hang the Do Not Disturb sign on the laboratory. We've got work to do.—GEORGE AND BEN BEEKMAN



Free Fall Ever wonder whether an elephant dropped from Mount Everest on the Sun would hit bottom before a feather dropped from the Empire State Building on Jupiter? (Spoiler: The feather hits bottom two seconds faster.)

## CyberBoogie

#### Children's Animation Software

PROS: Highly interactive; easy-to-use interface; excellent online help; catchy tunes. CONS: Limited control over characters; no facilities for creating your own art. COMPANY: Times Mirror Multimedia (314/531-2503). LIST PRICE: \$49.95.



ROM BETTY BOOP TO BEAUTY AND the Beast, song and dance have been staples of animated cartooning. CyberBoogie, a CD-ROM-based program, lets kids participate in this tradition. By manipulating on-screen characters, even young children can create animated dance routines to music played by Sharon, Lois, and Bram, the hosts of Nickelodeon's "Elephant Show."

CyberBoogie's designers have a fluid, fun approach to the famously tedious task of animation. First, you choose a background scene and a song for your cartoon. With the music playing, drag a CyberBoogie character, called an Ani-Mate, on stage. You move the cursor near the Ani-Mate's legs to lead the Ani-Mate through kicks or jumps, or by its arm to add a wave. The pro-

gram records all moves and immediately begins repeating them in time to the music.

Now that you've got it bopping to the beat, dance your character around the scene; the program remembers the path you trace. Give your character a prop; it stays with the Ani-Mate, and probably commences mutating on an animation cycle of its own. Bring in a second Ani-Mate, stick it onto the first, and watch them dance cheek to cheek.

Since CyberBoogie saves dances as a series of instructions, even the most elaborate production takes up less than 100K. (Of course, the file will play back only if CyberBoogie is loaded.)

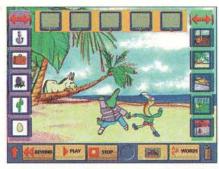
So far, so cool. So why did Cyber-Boogie leave me and my juvenile judges less than thrilled? I think it's because, at bottom, this is a pretty confining program.

CyberBoogie trades power for simplicity. That sounds reasonable, but in practice it means that each cartoon progresses in pretty much the same way. Music *must* accompany all animation. You can't switch backgrounds during a number. You're allowed only a few characters on stage at a time. Unless you have a 14-inch or larger monitor, all characters in a piece must remain on stage at all times. And so on.

Perhaps the most serious limitation of CyberBoogie is that it puts you in a strictly clip-art world. You can't draw or import your own backgrounds. There's no facility for creating new characters. And you can't import or record sound effects or music.

And as CyberBoogie lacks any type of editor for refining sequences, complex choreography is a try-and-try-again affair.

The Last Word CyberBoogie's makers rate it for children three to nine years old; I'd say that the program's easy interface, bouncy songs, and cute graphics make it a good choice for kids at the low end of that range. But the program's relative lack of features probably restricts it to the same group.—JOE MATAZZONI



**Boogie Down** You can choose background scenes and songs from the rotating display on the right side of the CyberBoogie screen; props and supporting cast are on the left. The window shades covering the menus at the top mean there's not enough memory to include another Ani-Mate.

You got a Mac. And then a few more. You tied them together. People started sharing. Everything

Funny thing about the Macintosh computer. With little fanfare and an idea known simply as "plug and play," it

turned a whole lot of novice users into networkers.

And is it any surprise? All you have to do is plug

a connector into your Macintosh, and you're networked. You can share printers. You can share modems. You can even share files with your peers.

This kind of "peer-to-peer" network is all some workgroups need.

Others, however, soon find they're ready to take the next step: a Workgroup Server dedicated to improving the ebb and flow of vital information.

How do you know if you're ready? Just ask yourself a few simple questions.

Do I have more than five computers tied together in a peer-to-peer net-

work? Is one printer always backlogged while others sit idle? When people share files, are their systems slowing down? Is there confusion about who has the latest data and where it resides?

If you answered yes to any of these

questions, it's definitely time to consider a Workgroup Server from Apple. Workgroup Servers provide a

centralized place for users to store and share files. Which means your shared files don't get lost, your systems don't slow down and users always have access to the latest information.

A server also gives you a place to put network applications and services—accounting programs, databases, e-mail and more—for everyone to use.

And that's just the start. With every Workgroup Server, you also get Dantz Retrospect Remote, so you can back up every system on the network—clients and servers—automatically. Plus Apple® RAID disk mirroring software, so you can rest easy about data reliability.

Want more still? Add FileWave software to your server, and you can easily distribute new programs and upgrades from the server. Or add Apple Remote Access software, and users can access your network from anywhere.

"OK," you say, "but how difficult is it to use a Workgroup Server?" It's as easy as using a Macintosh. All you have to do is connect the components, turn on the power, and you're ready to go.

Choosing the right server is just as easy. We have three models based on the new PowerPC™ RISC chip—the Workgroup Servers 6150, 8150 and 9150.

No matter which one you choose, you're backed by our expert phone support, 24 hours a day, 7 days a week.

And now, for a limited time, you'll get GraceLAN
Server Manager software,

a \$395 retail value, at no extra charge.\*

To get your free Workgroup Server brochure or for more information on our server trial program, simply pick up the phone and call us at 800-538-9696, ext. 430.\*\* And unlock the power of your workgroup. The power to be your best.\*



#### SPECIAL REPORT

clones today - clones tomorrow

# First

MACWORLD LAB TESTS

# 101010ES

like a Mac, and even quacks like a Mac, yet is not a Mac? The future. Apple has code-named its forthcoming PowerPC 604-based PCI Macintosh *Tsunami*, but the real sea change for Macintosh users has already hit. Apple decided last fall to license the Macintosh Operating System. And the first wave of Mac clones was announced as 1995 began.

WHAT FEELS LIKE A MAC, PERFORMS LIKE A MAC, PLUGS AND PLAYS

Macworld Lab has tested prototypes of these very first Mac clones. The

results? The first clones work as well as Apple's Macs. That alone represents an auspicious start to Apple's reversal of its decade-long go-it-alone strategy. Although these first clones introduce no compelling new technologies, breathtaking features, or stunning industrial designs, they prove that Mac clones can be legitimate alternatives to Apple's own Macs.

We evaluated late prototypes of three of the first four clone models: desktop and tower Power Mac-compatibles from Power Computing Corporation, a Milpitas, California, start-up company; and a 68LC040-based tower from Bridgette, a small Southern California reseller of systems and drives. (Neither company had clones on sale when we went to press.) But the floodgates will open soon.

Within a few months, Radius will roll out high-end video workstations, which it announced in early January but is still developing. By April, DayStar Digital will announce plans to produce clones for digital photography and publishing. By next year, expect to see up to 30 Mac

clone makers: 10 to 15 small-timers, mostly supplied by Apple and Power Computing (which plans a large business selling motherboards to other Mac-clone developers); 5 to 10 niche players like Radius and DayStar; and 2 to 5 medium-size computer companies, such as Taiwan's Acer or Japan's Toshiba (see the sidebar "Mac Clones: Who's Next?").

Clone makers will choose from four basic approaches to creating clones—all of which are already reflected in the embryonic Mac-compatible market:

 Sell a few preconfigured models with slightly more appealing features at a lower cost than Apple does.

 Sell into specialty markets—such as digital video, education, or selected foreign markets—and perhaps package computers with other devices to create turnkey systems.

 Sell large volumes of inexpensive systems at razor-thin margins; offering a range of configurations.

Sell machines that support popular features that Apple has phased out or incremental innovations that Apple declines to offer. Examples include clones with both NuBus and PCI slots (after Apple moves to PCI later this year);

BY CHARLES PILLER

## THE FIRST MAC-COMPATIBLES

#### New Mac Looks

The arrival of Mac-compatibles will mean a variety of designs and features. The temporary cases shown here give a hint of the looks that the first clone developers are exploring.

rad 18

VideoVision illo

clones with built-in Ethernet transceivers, modems, and VGA ports; and clones that support 72-pin SIMMs. (Apple development documents indicate that the company is switching to 168-pin Dual Inline Memory Modules, or DIMMs, later this year. The new Mac/PC hybrid being developed jointly by Apple and IBM will also use these DIMMs; see "Mac Hybrids," in this issue.)

#### Half of Power Computing's busi-

#### ness will be selling Mac-compatible systems to other clone vendors

S T E P H E N K A H N G , president and CEO, Power Computing

Whatever approach clone makers take, until clones and their makers withstand the scrutiny of thousands of users, buying any clone will require customers to take a leap of faith. To make it a shorter leap, Macworld Lab tested not just performance, but compatibility with a wide range of hardware peripherals and software programs, and for look and feel. As part of that process, I wrote this article on the 100MHz Power Computing tower clone to discover the day-by-day feel any owner would experience.

#### Power Computing: Mainstream Macs

By the time this article appears, Power Computing expects to be within weeks of selling Mac-compatibles that offer modest improvements and cost 10 to 15 percent less than comparable Apple units—the Power Macintosh 8100/100 and 7100/80. Power Computing's machines are by far the most impor-



Variations on a

This artist's rendering of the desktop case design to be used by Power Computing evokes the Mac's look and feel while remaining distinct.

tant in the overall development of the Mac-clone market; they are the only true clones available for testing (the Bridgette model repackages an Apple motherboard), and Power Computing plans to sell motherboards to other clone makers.

At the late prototype stage, the unnamed 80MHz desktop and 100MHz tower machines offer nearly flawless Mac compatibility—consumers can assume that with few exceptions, the peripherals and software they now use with a Mac will work with these machines equally well. And the Power Computing units run as fast as their Apple counterparts. The results hold firm across basic business and graphics applications, math-intensive modeling and dataanalysis applications, and hard-drive performance.

First Offerings Initially, Power Computing will offer only these two models, but it should rapidly expand its product line at both the low and high ends over the next several months to include machines that support the Peripheral Component Interconnect (PCI) bus and the PowerPC 604 CPU. Power Computing even expects to release such systems shortly after Apple sells its first models using these technologies, later this year. Power Computing may also sell peripherals from Apple or other companies.

The systems we tested are in most ways similar to the equivalent Macs-including the use of Apple controller chips. This accounts, in large part, for performance nearly identical to that of the Power Macs. Down the line, Power Computing plans to produce its own controller chips-to enhance performance and reduce costs. The Power Computing machines also include several features that are identical to those found in their Power Macintosh counterparts: three open NuBus slots, built-in Ethernet, a 256K cache (expandable to 1MB), a SuperDrive floppy, and a 200-watt power supply.

But Power Computing offers several improvements over Apple's machines:

- The desktop unit can hold up to 200MB of RAM; the 7100's maximum is 136MB.
- Both units feature many accessible drive bays (three for the desktop model, one for the Power Mac 7100, four for the tower model, three for the 8100), although the 8100 offers two additional bays that are not accessible (for hard drives), while the Power Computing tower has no such bays.
- Like Apple's, the Power Computing machines support a single PDS slot. Apple uses its PDS slot for the High-Performance Video (HPV) card, which supports thousands of colors. Power Computing expects to use a card that includes a VGA standard connector (for PC-style monitors) and a Mac connector. Power Computing may ship some models without the card; those would support only 256 colors with their on-board video chips (comparable to the Power Macs' on-board video). For our tests, Power Computing supplied Apple's HPV card.

 Quadruple-speed (4x) CD-ROM drives may be used; Apple offers 2× drives as an option. The Power Computing prototypes we tested were not equipped with CD-ROM drives.

Power Computing's system design (except for the clock-oscillator chip that controls the CPU and bus speed, the two models' motherboards are identical) suggests a thoughtful, sophisticated approach. This sophistication derives, in part, from help from Apple, as well as from the fact that two key Apple engineers recently joined Power Computing.

The components are all solidly constructed with proper shielding. The motherboard is laid out in a baby AT format—a cheap, widely available, well-understood industry standard—perfect for selling to Mac-clone makers that have PC-clone businesses.

Power Computing also offers a few user-friendly improvements over Apple machines. By putting I/O components on a card, Power Computing can offer upgrades without a motherboard replacement, and it can offer different I/O options (such as thin coax or 10BaseT for Ethernet). Moreover, the I/O card plugs into a custom slot, saving a NuBus slot. Another welcome change: the cache and SIMM slots are much more accessible than on Apple's machines.

Unfortunately, Power Computing also made a few cost-saving compromises:

 Both models use nonstandard clock oscillators, so they won't work with current CPU boosters.

• The tower model offers a maximum of 200MB of RAM; the 8100's maximum is 264MB. This is because Power Computing uses no on-board memory, relying instead completely on SIMMs (72-pin, 70ns, like Apple's).

• Neither Power Computing machine has an interrupt button, although only programmers who do not use MacsBug will find this annoying.

Also, Macworld Lab experienced difficulty inserting three NuBus cards simultaneously due to a

flaw in the case; Power Computing says the problem will be fixed in shipping versions.

Compatibility Tests Clearly, the most important test is compatibility—less than 99 percent compatibility would probably kill any clone. The results of Macworld Lab's hundreds of tests with scores of devices and applications show that Power Computing understands this fundamental principle. We tried a range of printers (ink-jet and laser); a tape drive and a scanner; fax modems; Ethernet cards; input devices; video cards; SCSI accelerators; and optical, CD-ROM, and removable hard drives and drivers (see "Power Computing Clones: First Lab Tests").

The hardware tests revealed only three problems. When using the RasterOps Paintboard Prism videodisplay card, the screen image shakes—possibly due to a NuBus problem or a low-level software incompatibility. With the Atto SiliconExpress IV SCSI-2 accelerator, we experienced occasional errors using BlitzCopy and making Finder copies—possibly a software incompatibility with the driver that the Atto SCSI board installs. And the stereo-output jack on the desktop model actually provides mono output—but this should be corrected in the shipping version.

We also conducted a range of tests with dozens of leading applications, including page-layout, graphics, CAD, video-editing, word processing, networking, compression, mathematics, database, and virus-detection programs. Compatibility was nearly perfect; Microsoft Word 6.0, which suffers from extension conflicts on any Mac, encountered them more easily on the Power Computing clones.

#### PDS slot (for video) PDS slot (for video) Custom I/O slot **NuBus slots NuBus slots** ROM L2 Cache 1/0 controller Memory I/O High-speed controller memory High-speed controller memory controller Bart chip Bart chip ROM SIMM slots SIMM slots On-board RAM L2 cache Power PC 601 processor

Motherboard Transformed

Power Computing's prototype Power Macintoshcompatible motherboard (below left) fits an Apple 8100 series motherboard (right) into a baby AT format—an inexpensive standard in the PC industry. Only three NuBus slots will be included on the shipping version.

## Power Computing Clones: First Lab Tests



#### **Highly Compatible**

SOFTWARE	HARDWARE		
Tower system (100MHz)  Desktop system (80MHz)	Tower system — Desktop system —		Tower system ————————————————————————————————————
ACI US 4th Dimension 3.2	Storage Systems		Input Devices
Adobe Illustrator 5.5	88MB SyQuest drive		Apple keyboards, mouse
Adobe PageMaker 5.0a	90MB Bernoulli drive		Kensington Smart Mouse
Adobe Premiere 4.0	● 650MB optical drive		PlainTalk microphone
Adobe Type Manager 3.8.1	Apple CD-ROM driver		Wacom tablet
Aladdin Stuffit Deluxe 3.5	APS HyperDAT tape drive via Retrospect	• B •	
Apple HyperCard 2.1	Atto SiliconExpress IV SCSI-2 accelerator	•C•	Telecommunications
Apple QuickTime 2.0	Casa Blanca Works CD-ROM driver	• NT	AppleShare as client
AppleScript (basic functionality)	External hard drive	•D•	AppleShare as server
Ashlar Vellum 3D 2.63	Format hard drive w/Casa Blanca Works Drive7	• NT	Asanté Ethernet card
CE Software QuicKeys 3.0	Format hard drive w/CharisMac Anubis 2.52	• NT	Connect to ARA 2.0 via V.34 modem
CE Software QuickMail 3.0	Format hard drive		Connec to FirstClass BBS via V.32
ClarisDraw 1.0	w/FWB Hard Disk ToolKit 1.5	NT .	and V.34 modems
Claris MacWrite Pro 1,5v3	Format, read, write 1.4MB floppy disk		Connect to Shiva LanRover via V.34 modem
JarisWorks 3.0	Format, read, write 1.4MB PC disk		Farallon Etherware Card
Compactor Pro 1.5	w/PC Exchange		Fax via Global Village modems and software
Datawatch Virex 5.5	Format, read, write 800K floppy disk		PostScript fax via Apple LaserWriter 16/600 PS
Engineered Software PowerCADD 1.0	FWB CD-ROM driver	NT .	CE Software QuickMail 3.0 as client
arallon Timbuktu Pro 1.0	FWB JackHammer SCSI-2 accelerator		
rame Technology FrameMaker 4.0.4	NEC CD-ROM driver	O NT	Printers
Graphisoft ArchiCAD 4.5+	NEC MultiSpin 3X CD-ROM drive	• NT	Apple Color StyleWriter 2400
Graphsoft BluePrint 5.0	SCSI chain, 6 devices		Apple LaserWriter 16/600 PS (AppleTalk)
Graphsoft MiniCAD 5.0.1	Toshiba 3501 4X CD-ROM drive	• NT	Apple LaserWriter 16/600 PS (EtherTalk)
Microsoft Word 6.0	• A • A		Apple LaserWriter 630 (AppleTalk)
Novell WordPerfect 3.1	Graphics and Video Hardware		Apple LaserWriter 630 (EtherTalk)
QuarkXPress 3.31	Apple One Color Scanner w/Light Source Ofoto		Epson Color Stylus
Ray Dream Designer 3.11	Apple PDS-based video card		Land of the same o
SoftArc FirstClass 2.6 client	Internal video circuitry		
Specular Infini-D 2.6	Radius PrecisionColor 24X		
Strata StudioPro 1.5	Radius Thunder IV GX 1360		
StrataVision 3d 3.1a	Radius Video Spigot		
Symantec Norton Utilities 2.0 Speed Disk	Radius Photo Engine		
Wolfram Research Mathematica 2.2.2	RasterOps Paintboard Prism	●E ●E	

= passed; NT = not tested. A With many system extensions loaded, Word would not run. B Needed to increase Restrospect's memory allocation over normal for a Power Mac. C Occasional errors could have been caused by card-driver conflict, not Power Computing's hardware. D Occasional system crashes with DATerm on. E Video display was shaky.

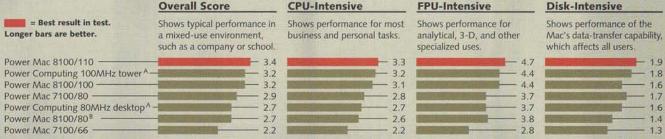
#### BEHIND OUR TESTS

Macworld Lab conducted more than 400 compatibility tests of Power Computing's Power Mac clones. Although both systems were prototypes with some development work yet to be

completed, Macworld Lab found very few compatibility issues. -Macworld Lab testing by Matt Clark, Mark Hurlow, Danny Lee, and Tim Warner

#### As Fast As an Apple

Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in decreasing order of overall performance.



A Early prototype; final performance may increase somewhat. B Discontinued product.

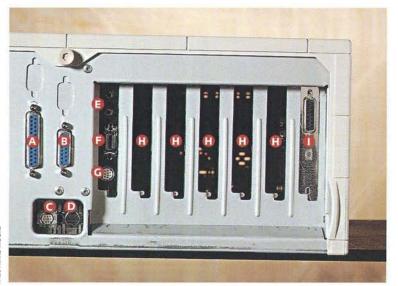
#### BEHIND OUR TESTS

Macworld Lab tested several functions in eight key programs These results may be compared with the benchmarks of Mac plus the Finder to determine real-world performance for the three critical performance areas faced by most users: basic processing (the CPU-Intensive score), math processing ability for specialized applications like modeling (the FPU-Intensive score), and hard drive performance (the Disk-Intensive score).

We then averaged the results (giving the CPU-intensive score 60 percent of the weight) to derive the overall score, which gives most business users an accurate measure of their Mac's performance. (Due to rounding, some insignificant differences in various results are not reflected in the overall scores.)

systems and upgrades in the January 1995 and later issues.

We tested native PowerPC versions of software on the Power Macs and Power Computing Mac clones. The software included System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.01, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.2.2. All systems tested had 24MB of RAM and were run with 8-bit color on 16-inch monitors.-Macworld Lab testing supervised by Lauren Black and



**Mac-Clone Ports** 

This back panel of a Power Computing desk-top prototype includes these ports: (A) SCSI; (B) on-board video; (C) AppleTalk; (D) ADB; (E) audio I/O; (F) Ethernet; (G) serial; (H) Nu-Bus (only three will remain on the final version); (I) high-performance video.

These clones are virtual Macs in their functionality and performance. But do they feel like Macs? Do subtle flaws provide nagging reminders that these are less than the real thing? After living with the Power Computing tower for several days, I can say without reservation that they might as well be Macs. Macworld Lab's technical analysts agree.

A Good Value? So we know that Power Computing will enter the Mac market with high-quality machines. Unfortunately, what we don't know will ultimately determine whether these clones are competitive: the company has not yet announced its final configurations; policies for warranty, software bundling, and technical support; and most important, pricing. Power Computing says it plans to undercut Apple prices by 10 to 15 percent on comparable models. Time will tell if added value and modest price competition will push consumers past any hesitancy about the clone alternative.

Power Computing plans to take orders only via the Internet until the company ramps up production and establishes a standard mail-order infrastructure, either on its own or with one or more large mailorder catalogs. (The Internet address is info@powercc.com.) The company says it will have only about 1000 machines to sell in the first month after they begin shipping in mid to late March.

Even at only a 10 percent price break, these clones should be well worth the money. Still reluctant to make that leap of faith? Consider this: Apple needs Power Computing to succeed and has publicly identified itself with the new company. If Power Computing can pull together a solid service-and-support operation, the risk should be small.

#### Radius: Creators' Clones

The second announced clone maker, Radius, merged with SuperMac Technology last year to become the dominant supplier of Mac video-display and video-production cards. It plans clones consistent with its expertise: high-end digital-video and color-publishing systems. Radius intends to wrap a Mac-compatible computer around its expensive video cards, then add a RAID storage system, monitors, and software to provide a turnkey system for multimedia profes-

sionals. The company would also sell clones separately—but only machines designed to fit into an overall Radius multimedia system.

No prototypes were ready to test for this article, and Radius has not announced pricing, configurations, or release dates, although it expects to have these details by early March.

By selling clones within its core business, Radius hopes to help buyers justify the purchase of costly add-ons; buyers can factor in Radius's ability to ensure that all components work together reliably. A source close to Radius says that the company may offer special furniture designed to show calibrated monitors in the most accurate light.

Radius may be an ideal niche player for several reasons: it has a strong reputation for high quality, a well-established customer base, in-depth knowledge of the Mac, and the ability to support specialized customers more effectively than Apple can. Radius is one of the few companies with prior experience licensing the Mac OS: the Rocket accelerator was essentially a Quadra 950 on a card. Radius's "Skylab," a multiprocessor-based publishing server, never saw the light of day, but it gave the company invaluable insight into the intricacies of designing a Mac clone.

If Radius can come up with a cost-effective system—and the company's history suggests that it can—Radius clones should be a relatively safe bet for the right consumers.

#### DayStar: Going for Speed

A source close to DayStar Digital, primarily known for its Mac accelerators, says that the company will soon announce plans to produce a high-end publishing and multimedia clone for release by the end of the year, and that the company may eventually produce midrange clones as well.

"[Their clones] will provide workstation performance... offering something faster than what Apple has." The source implies that the clone would use new compression techniques and would be designed for memory- and speed-intensive applications such as 3-D modeling, digital photography, and complex desktop publishing. DayStar intends to cede the video market to Radius, according to the source.

Is DayStar equipped to produce clones worth buying? The answer is not as clear as with Radius.

On the positive side, DayStar enjoys a reputation for reliability and quality and probably has more experience working with PowerPC chips than any other independent Mac developer. It produces PowerPC-based upgrade cards and therefore has the experience in system design needed to pull off the technical side of creating a fast clone.

But DayStar's relations with Apple haven't always been cozy, and its timing and strategy haven't always panned out. Much of DayStar's core business (like that of many other accelerator companies) evaporated when Apple brought out cheap Power Macs and PowerPC accelerators. The company adjusted by developing high-end PowerPC-based accelerators—DayStar's 100MHz PowerPro (\$2199, 404/967-2077) is now the fastest Mac Quadra upgrade available—but it didn't arrive till early 1995, so long after equally fast and even faster Macs were introduced that the company lost the jump on Apple.

The need to redesign an earlier version of the 100MHz card to keep the price down may account for the delay.

Moreover, Apple cut off a prime opportunity for DayStar when it swallowed the low-end PowerPC upgrade market. Apple's Power Macintosh Upgrade Card for Entry-Level Macintosh (the one codeveloped with DayStar, which calls its version the Pow-



#### In the long run, the overall Mac OS

#### market will grow much faster than the cannibalization rate by clones

DON STRICKLAND, Apple's vice president for licensing

erCard 601) sells for \$599. DayStar's cards have been going for \$679 to \$749 via mail order—a price no one who knows about the Apple alternative will pay.

Unless DayStar can sell clones at a price well below that of Apple's fastest Macs—and many of DayStar's accelerators have already become too expensive to compete against Macs—this is probably a strategy for failure. Apple routinely speeds up its machines a couple of times a year. Without a lucrative high-end niche (like Radius's), DayStar faces an uphill battle attracting Apple customers based on relatively modest, short-lived speed improvements.

DayStar might have better luck in a business it

Floppy drive slot SCSI connector
I/O controller

Audio I/O

Ethernet

Serial port

I/O on a Card

Power Computing moves its I/O circuitry to an addon card. This enables upgrades without replacing the motherboard. understands well: low-cost PowerPC motherboard replacements to Mac models that Apple has abandoned as upgrade candidates—such as most of the Mac II-, LC-, and Performa-series machines. Day-Star says it is exploring such replacements.

**Bridgette: Repackaged Systems** 

Bridgette tackles the clone market from a totally different angle: its first model—called the Quatro 850 and sold under the Cutting Edge brand name—is an inexpensive and expandable Mac-compatible. The system we tested was based on a 25MHz 68LC040 (no math coprocessor) Centris 650 motherboard coupled with a CPU booster from Newer Technology, which improved clock speed to about 31MHz, compared with the Quadra 650's 33MHz. (The LC040-based Centris 650 motherboard was discon-

tinued by Apple shortly after the Centris 650 began shipping; Apple then used the full 040 for all Centris 650 models.) The Quatro 850 (which sounds strangely reminiscent of Apple's Quadra 800) performed at the same speed as would be expected from an equivalent Apple model; compatibility with applications and peripherals was also fine. Because the Quatro merely reuses Apple parts, we do not include it in our benchmarks.

While the Quatro performs like a comparable Mac, its design has a haphazard quality. For example, the CPU booster obstructs use of one of the three NuBus slots. You cannot turn the power on from the keyboard, and if you shut the system down using software, the monitor turns off, but the clone itself doesn't. Also, the Quatro ships with a Next mouse and keyboard. While Mac-compatible, the keyboard has a different layout and takes some getting used to.

Expandability Options The Quatro 850's primary selling point is expandability. It improves on the Quadra 650 by adding more drive bays (five; the Quadra 650 has three), a 3× CD-ROM drive (the Quadra 650 has a 2× option), and a SyQuest 270MB removable-cartridge drive (which was not connected in the prototype tested). The unit also ships with a 365MB hard drive, 8MB of RAM, 1MB of VRAM, and a few software utilities.

Does this configuration make sense for very many people? Probably not. The main selling point of the Quatro 850 is the ability to add internal storage such as large hard drives and tape, optical, or removable-cartridge drives. People who typically need such high storage capacity generally work with massive graphics, database, CAD, or photographic files. These are the very people who aren't likely to be enthusiastic about the performance they'd get on a 68LC040-based machine—at the low end of Apple's current lineup.

Moreover, most people who need tower computers want the big and bulky boxes off their desks. But to use the Quatro 850 effectively, you would load it up with removable-media drives that require you to keep the tower within easy reach. The design requires you to open a door on the front panel to access the drives, which increases the machine's footprint on the desk by about 20 percent.

Priced Right? Still, on price alone a Quatro 850—\$1749 mail order for the model we tested—

could certainly find buyers. (Bridgette has offered dealers seven system configurations, with estimated street prices ranging from \$999 to \$3699.) But probably not many. The closest Apple Mac now on the market is the Performa 575, which comes with a smaller hard drive and less RAM than the Quatro 850 and lacks a SyQuest drive. But the 575 matches the Quatro 850's performance and includes a fax-modem and color monitor. The Performa 575 sells for less than \$1800; boosting RAM to 8MB would cost an additional \$150. To be sure, the 575 lacks the Quatro 850's storage and NuBus expandability; but the example makes it clear that Bridgette's pricing, while competitive, is no fire sale.

How does Bridgette set prices as low as they are? Bridgette obtains Mac motherboards from discontinued models and repackages them. Bridgette says it will eventually develop Power Mac-compatibles in this way, and it may develop its own motherboards

or purchase boards from Power Computing.

Feeling Lucky? Is Bridgette a safe bet for consumers? To answer the question, consider this history: Bridgette was formed in 1992 out of the ashes of the Wyoming-based peripherals reseller Ehman, Inc. (The brand name Cutting Edge was also obtained from Ehman.) Founder Michael Ehman closed the company in 1992 after amassing some \$4 million in debts. Just before the company closed, former employees said that Ehman, Inc., routinely sold used hard drive mechanisms as if they were new (see Conspicuous Consumer, August and October 1992).

Michael Ehman serves as Bridgette's product manager. He tells *Macworld* that the company employs seven people, including his wife, Deborah Inman, who serves as president. He says that Bridgette is privately held by a group of investors and that he has no ownership interest. Ehman acknowledges, however, that "I was the driving force behind con-

## Mac Clones: Who's Next?

Several major computer companies are poised to enter the Macintosh clone market. Whether and when they take the plunge will depend on their negotiations with Apple and the fortunes of their other markets. Based on conversations with industry sources, Macworld has identified the companies most likely to ship clones in the next two years.

-Cameron Crotty and Nancy Dunn

#### 1995-1996

#### MOTOROLA

- PC sales: Just entered workstation market.
- Primary business: OEM of chips (including several PowerPCs), embedded controllers, power supplies, modems, and pagers.
- PowerPC/Apple ties: Partner with IBM and Apple in PowerPC development. Now offers PowerStack series of PowerPC-based servers for Unix and Windows NT.
- Potential role: Motherboard manufacturer, systems OEM, workstation systems that also run Mac OS.

#### Acer

- PC sales: 264,000 in Q2 1994.
- Primary business: OEM and reseller of desktop, server, and notebook computers and peripherals.
- PowerPC/Apple ties: Reportedly manufactured the PowerBook 145.
- Potential role: OEM and branded systems.

#### IBM

- PC sales: 892,000 in Q2 1994.
- Primary business: OEM and reseller of mainframe computers, desktop and server PCs, and notebooks. Also, wide range of peripherals and software.
- PowerPC/Apple ties. Partner with Motorola and Apple in PowerPC development.
- Potential role: Reseller in the short term, in the long term will focus on the converged PowerPC platform.

#### TOSHIBA

- PC sales: 290,000 in Q2 1994.
- Primary business: OEM and reseller of notebook computers.
- PowerPC/Apple ties: Has license to make PowerPC CPUs.
- Potential role: Systems OEM and reseller.

#### ZENITH

- PC sales: 158,000 in Q2 1994.
- Primary business: OEM and reseller of desktop, server, and notebook computers and peripherals.
- PowerPC/Apple ties: Parent company ry Groupe Bull, a member of the PowerOpen consortium, has announced PReP-compliant PowerPC servers.
- Potential role: Systems OEM and reseller.

#### olivetti

- PC sales: 140,000 in Q2 1994.
- Primary business: Parent company is computer and peripherals OEM and reseller based in Italy; recently

launched telecommunications group.

- PowerPC/Apple ties: Reported to be negotiating with Apple, Motorola, and IBM to market PowerPC-based machines. Funds the Mac-clone maker Power Computing.
- Potential role: Systems reseller in Europe.

#### **VOBIS**

- PC sales: 96,000 in Q2 1994.
- Primary business: Desktop PC reseller based in Germany.
- PowerPC/Apple ties: None
- Potential role: Systems reseller in Europe.

#### BAN DAI

- PC sales: Just entering market.
- Primary business: Toy maker.
- PowerPC/Apple ties: Licensed the Mac-compatible Pippin multimediaplayer platform from Apple (see "Apple Licenses Game Player," News, in this issue).
- Potential role: OEM and seller of branded game systems.

#### 1996 and Beyond

#### NEC

- PC sales: 420,000 in Q2 1994.
- Primary business: OEM and reseller of mainframe, desktop, and laptop computers and peripherals; leads Japanese market in PC sales.
- · PowerPC/Apple ties: None.
- Potential role: Systems OEM and reseller.

#### DELL

- PC sales: 292,000 in Q2 1994.
- · Primary business: OEM and reseller
- of PCs, servers, and notebooks.
- PowerPC/Apple ties: Several former Apple executives now work there.
- · Potential role: Systems reseller.

#### FUĴITSU

- PC sales: 126,000 in Q2 1994.
- Primary business: OEM and reseller of desktop, server, and laptop computers and peripherals.
- PowerPC/Apple ties: Has agreements with Apple for multimedia software development.
- Potential role: Systems OEM and possible reseller in Asia.

#### Canon

- PC sales: 6000 in 1992.
- Primary business: OEM and reseller of desktop and server computers and peripherals.
- PowerPC/Apple ties: Invested \$11 million in FirePower Systems.
- Potential role: Systems OEM (via FirePower) and reseller in Asia.

#### Fire POWER SE

- PC sales: Just entered market.
- Primary business: OEM developer of PowerPC desktop and server systems.
- PowerPC/Apple ties: Announced PReP-compatible systems last year; promised to deliver boards that comply with the Moccasin specification within 90 days of its publication.
- Potential role: Systems OEM.

## **Apple's**

#### HOW MAC-COMPATIBLES WILL EMERGE

# Clone Strategy

Apple has only one chance to stay competitive and increase its share of the computer industry. Cloning is that chance, and it's hardly a new idea even for the Mac. Last year Cupertino-based NuTek released the Duet, a Macand-PC-compatible, without Apple's help. But the complexity of reverse engineering was too formidable; the NuTek machine failed in performance, compatibility, time to market, and cost (see Reviews, February 1994).

Things will be different now that Apple CEO Michael Spindler has made the decision to jumpstart Mac clones. The Mac-clone industry will bear certain similarities to the PC-clone industry of the 1980s, but there will also be key differences. Unlike Apple, IBM never promoted cloning; it never issued a standard specification for PC architecture and didn't own its operating system. The result: a lot of junk emerged along with good machines. And a raft of incompatibilities characterized the market as a whole. Unlike IBM, Apple has an overall strategy for a clone market-a strategy designed to grow Apple.

To avoid the incompatibility trap, Apple is setting basic rules for implementation. The Power Computing machines suggest that Apple's ownership of the Mac OS and ROM should make it possible to enforce relatively high standards.

#### **Open Licensing**

Any company that licenses the Mac OS can market computers in any geographic area using any method of distribution it chooses. This ensures a broad range of licensees and makes Mac clones a viable proposition for the biggest PC companies. "[Will] third parties grow the overall Mac OS market?" asks Apple's vice presi-

dent for licensing, Don Strickland. "We believe that they will."

The first announced clone makers, Power Computing and Radius, have gotten most of the attention, but the seriousness of Apple's approach is also apparent in the first licensee of the Mac OS—Bandai, the giant Japanese producer of the Mighty Morphin Power Rangers, a TV show and toy series that haunts nearly every parent of a child between ages four and nine. Bandai will produce a Nintendo-like game platform called Pippin that uses a limited form of the Mac OS.

It may seem like a typical Apple misstep to license first to a toy maker, feeding into the stereotype that Macs are not serious business computers. But the Bandai deal actually shows Apple's sophistication—CD-ROMs developed for Pippin will play on Macs without modification, and if Pippin finds a fraction of the audience of Bandai's other ventures, it will spin many developers into the Mac OS orbit.

#### Structured for Growth

Apple plans to take several steps to ensure that clone makers succeed. The company will sell the Mac OS at a nominal fee, so that clone makers can keep their prices competitive against both Apple Macs and Windows PCs. Apple intends to help the initial clone makers get started by providing marketing assistance.

Apple will make key chip sets, motherboards, and other essential parts available at a reasonable price. In general, Apple is working to replace Mac-specific parts with generic PC equivalents to reduce supply costs for itself and the clone makers alike. And Apple has helped Power Computing build its own motherboard—based on the popular

baby AT PC format—for sales to other clone makers. Expect clones based on this design to go after the business market aggressively in coming months.

Apple will also offer peripherals to clone makers for sales with the Apple logo or the clone makers' brands. "We ask what other help Apple can provide to make the clone systems appealing to customers—right down to cards and cabling, ClarisWorks, and eWorld," says Strickland.

#### **Facing Competition**

Apple will remain the overwhelming force in the Macintosh market



retain the notebook market for some time. Apple's designs are so popular, says Carl Hewitt, Power Computing's software engineering manager, that "unless someone licenses both the product design and the computer, why bother? Then you'd have to compete [against Apple] on manufacturing—and could win, but that's not a race most people would want to enter."

"Most licensees will want to use the chip of the future," says Strickland, "and we don't yet have [PCI- or] PowerPC-based notebooks." Still, Strickland predicts that PowerBook clones will follow about a year after desktop models.

#### **Top Challenges**

Strickland predicts that the Mac OS market share won't show much growth until clones have had six to nine months to establish a presence. During this period, clone companies will primarily take what would have been Apple's sales. Apple is convinced, however, that the overall Mac OS market will grow much faster

MICHAEL SPINDLER, president and CEO, Apple

for the foreseeable future. But it will begin to face serious competition by 1996 when Macs based on Moccasin, the converged-hardware reference platform, begin to appear.

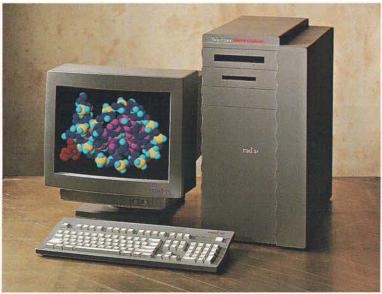
What part of the overall market does Apple intend to own? How will the company differentiate itself in the long run? Apple vice president Ian Diery cites the business publishing and graphics, education, and home markets as key to Apple's strategy. "You will see us focus our dollars and energies on these markets and customer uses that have made us successful, where we are the market leader," he says. "We will continue to stand out by being the best at the user interface, multimedia, graphics, communications, and collaboration."

Clearly, look for Apple to

than the "cannibalization rate," as Strickland calls it. And if clones really take off, Apple might become the hungriest cannibal.

To make clones successful in the long run, Apple needs a big player—like IBM or Compaq—to license the Mac OS. But don't count on a company of that size to jump in until after Moccasin is completed. Moccasin will offer the economies of scale and multiple-OS flexibility that big players need to justify a major foray into the Mac market.

Moccasin will also relieve Apple of a big headache: being the sole source of support for clone makers. "We're resigned to the fact that we're going to have to provide substantial help [for now]," says Strickland, "but we don't want to be in that business long term."



Multimedia Workstation

FRANZ-MOORE/SCREEN IMAGE BY PHOTO RESEARCHERS

Radius has announced a video workstation that it expects to package with a monitor, RAID storage system, video card, and software for multimedia professionals.

vincing those investors [to form Bridgette], so I'm kind of responsible for making sure their money is returned to them some day." Ehman adds that he personally owes more than \$1 million to creditors associated with Ehman, Inc., and that he may need to declare bankruptcy soon.

In fairness, many companies go out of business, then reorganize successfully. According to Ehman, Bridgette has supported and will continue to support all of Ehman customers through its toll-free number; a spot check by *Macworld* verified that technical support is indeed available.

History aside, however, there are other reasons to question whether Bridgette has actually found a viable formula for making a clone. Ehman and Newbom say that a partner (whom they would not name) buys the company's motherboards from Apple. But Apple spokeswoman Jeni Johnstone says that neither Bridgette nor any other part-stripping operation has signed or been offered a license for the Mac OS. No license, no legitimate clone.

#### The Last Word

Whether or not Bridgette succeeds, the Bridgette scenario holds important lessons for potential consumers of Mac-compatibles. Many small companies will try to cash in on this new opportunity. Just as in the PC-clone market of the 1980s, unsanctioned gray markets will emerge in the Mac-clone market of the 1990s. The clone market will become polluted by computers that do not meet the strict compatibility standards that are the core of Apple's licensing program (see the sidebar "Apple's Clone Strategy"). Moreover, many clone makers will rise and fall with breathtaking speed, leaving consumers without recourse. It's an inevitable facet of a new industry.

The initial test of the Mac-clone concept, however, will be whether a producer of mainstream clones for the mass market can succeed. For now, that company is Power Computing. What can be predicted from Power Computing's strengths and weaknesses? The company has to solve the classic problems of an ambitious start-up. It must build an infrastructure for manufacturing, sales, and support—and do so fast enough to satisfy customer demand if its products gain popularity quickly. Many companies ascend overnight only to collapse due to lack of organization in a single key area.

Power Computing also might have to settle for very narrow profit margins to woo customers away from Apple, even if the Power Computing clone product is superior. Eventually, it has to offer such compelling deals that the Mac OS market broadens beyond current Mac buyers—a difficult task when Intel-based PCs offer a similar range of features.

In its favor, Power Computing has produced solid technology. By working on system designs even before it secured a license for the Mac OS, Power Computing leaped ahead of potential competitors. And Power Computing has adopted a mail-order sales strategy, following the examples of Dell Computer Corporation and Gateway 2000 in the PC market. This makes sense because Apple has not focused on this method of distribution.

Power Computing's ultimate success or failure, like that of all clone makers, will depend on containing costs. This is where CEO Stephen Kahng comes in. Best known for his design of the Leading Edge Model D—a top-selling PC clone of the mid-1980s—Kahng is well known and respected in the industry. He will make sure that Power Computing uses as many standard PC parts as possible to keep costs down. And Kahng's network of contacts around the world should keep manufacturing costs low. (Kahng predicts his company will sell 100,000 units in the first year and that Power Computing will become a \$1 billion company in five years.)

Although Power Computing is a start-up, Italian computer giant Olivetti is its primary investor. Olivetti has long considered jumping into the Macclone market and clearly views Power Computing as its first entry point. This could mean solid backing for warranties and development promises.

Finally, Power Computing intends to become a major supplier of Mac-compatible motherboards. The company has already made a large initial investment in system design. Selling motherboards to other clone makers will let Power Computing leverage its investment, with an eye toward eventually making its systems a second Mac standard.

On balance, Power Computing looks poised to succeed, even if it doesn't achieve Kahng's grandiose predictions. If the company's clones do take off, look for the Mac industry to transform itself rapidly. The current clones are a proving ground for both Apple and the new industry it's trying to spawn. The biggest, most important players in the computer industry—including IBM and Compaq—are looking on with keen interest, assessing the approaches of the Mac-clone pioneers.

After the converged Mac/PC platform is released, those giant computer companies will decide whether to try to take over a big share of a growing Mac-compatible market. If they do, the world of Macintosh might look a lot like the world the rest of personal computing resides in. If you care about the survival of the Mac, that's the best news in years.

Senior editor CHARLES PILLER reports on Macintosh clones and the links between the Macintosh and other operating systems.

clones today - clones tomorrow

APPLE ALWAYS GAMBLES TO ACHIEVE GREATNESS. NOW THE COMPANY IS taking its most important strategic gamble since the Mac's genesis a decade ago. It has committed to a new future for Macintosh computing—a future at odds with Apple's past approach, with its historic corporate sensibilities, and indeed, with the idealized, rebellious image that Apple invented and promoted. The future of Apple is now

the future of all personal computing: convergence. Apple announced in November 1994 that, together with IBM and Motorola, it would create a new computer platform that can run all of the major operating systems except Windows 3.1 and Windows 95. It also declared its intention to openly license the Macintosh Operating System (see "First Clones," in this issue). Through licensing, Apple expects to

grow the Mac OS market share dramatically.

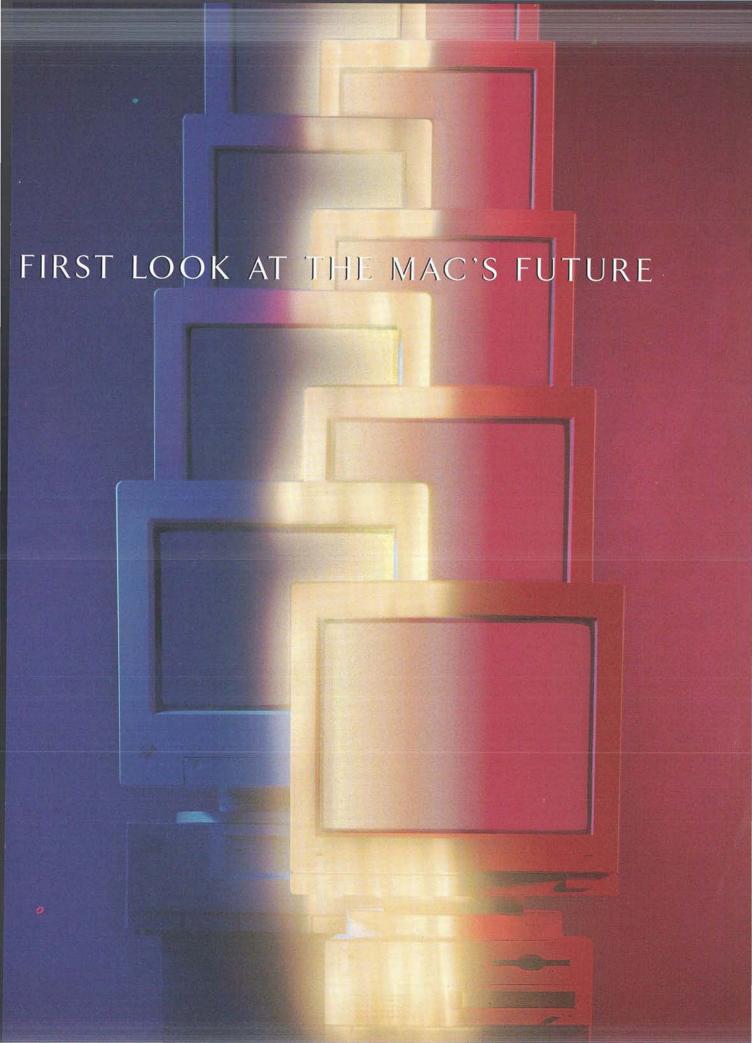
If the strategy succeeds, Apple could see its trendsetting technologies seized not just by millions of new Macintosh users, but gradually by the industry as a whole, as those technologies are adopted by manufacturers of the generic platform. But if this strategy fails, Apple will probably become increasingly irrelevant to the larger PC environment. The company's survival would clearly be at stake. Risky. But not as risky as standing still, when stagnation inevitably means being crushed by relentless competitors. This move represents Apple's last best hope for a serious challenge to the Intel-Microsoft standard.

Apple's strategy is no half measure, as demonstrated by three crucial and related decisions:

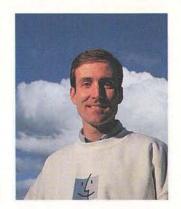
· The company will gradually phase out the current Power Mac platform in favor of new computers based on Moccasin, one code name for the new converged platform. The first Moccasinbased machines from Apple, due out in late 1996, will be higher-end Macs; but before long, Moccasin will be the Macintosh standard for everyone from home users to the biggest corporations.

· Open licensing has arrived. Many Apple executives have long realized that only by completely opening Mac OS licensing—selling the system to virtually all takers-could they stimulate a burgeoning clone market. Moccasin will enable this step because it decouples the Mac OS from Mac hardware, while retaining key Mac hardware features. This frees Apple from the predicament it now faces with the first Mac clones: supporting and selling parts to clone makers, and working with Macintosh parts suppliers to do likewise, is a costly, complex distraction from Apple's core business. Also, having to work with a distracted Apple is a serious bottleneck for clone makers.

BY CHARLES PILLER



• Apple, IBM, and Motorola are giving away their platform. To pump up the Moccasin market, they will offer royalty-free licenses for suppliers of converged-platform chip sets and system developers alike. (Apple will also keep its OS licensing fees competitive with Windows pricing.) Where will the three partners make their money? From selling their own Moccasin-based computers, from applications



#### This move enables cloning. You

#### can now have multiple suppliers for the hardware-that's the key thing.

JIM GABLE, Apple's Power Macintosh product-line manager

and peripherals for the Moccasin market, and from royalties on the PowerPC chip itself. And Apple and IBM hope to make money selling the Mac and OS/2 operating systems, respectively, and regular updates. Motorola and IBM also hope to supply many of the core chip sets. The three companies realize that they must maximize acceptance of the new platform by bringing in as many licensees as possible. It's the only way to compete with Intel-based machines in the long run.

Open licensing of the new platform and the Mac OS means that any company can build Mac-compatible computers from inexpensive, off-the-shelf parts and sell into any market or geographic region. This will let Moccasin-based Mac-compatibles compete on a cost basis with their Intel-based counterparts. "The goal is . . . to fit into the existing structures for building commodity parts, yet keep performance very high," says Carl Stoltze, vice president for marketing at Motorola Computer Group.

"This move enables cloning. You can now have multiple suppliers for the hardware—that's the key thing," says Jim Gable, Apple's Power Macintosh product-line manager.

The only barrier to a complete separation of the Mac OS from hardware will be the Mac ROM. Although inflexible (ROM cannot be altered), the ROM-based Mac OS offers two key advantages over other OSs, all of which are completely RAM-based: ROM chips cost less than RAM equivalents, and the Mac ROM allows users to start up a sad Mac from a floppy and then run most features of most applications. (You can't do that with Windows or OS/2.) So at least the first version of Moccasin will require a slot for Mac ROM.

#### Full Compatibility Predicted

This integration of the Mac ROM reflects a design approach based on folding all essential components from the Power Mac platform—including the ADB input-device bus, and Mac-style serial ports with GeoPort capabilities and LocalTalk support—into IBM's PowerPC Reference Platform, or PReP (see the diagram "The Anatomy of PC/Mac Convergence"). In some cases—including the I/O controller and the combined memory and PCI (Peripheral Component Interconnect) bus controller—this integration requires completely new application-specif-

ic integrated circuits (ASICs) to accommodate both PC and Mac hardware requirements.

IBM and Apple say that this approach should mean that Moccasin will support nearly flawless backward compatibility for all the applications and peripherals of the OSs that will run on it. Such claims are plausible, at least for the Mac OS, for two basic reasons. First, the PowerPC processor family, the basis of Power Macs, will be the core of Moccasin. Apple made the most difficult compatibility transition last year, when it graduated from its old 680X0-series processors. Second, by this summer, long before it builds Macs based on Moccasin, Apple will have cleared the next-highest hurdle—the transition from NuBus to the PCI bus.

"For someone already owning a Mac, this model almost doesn't deserve the term transition. It'll be just like the next Power Macintosh model," says Gable. Many PC users will see the same effect, since Moccasin will also support the common PC hardware standards and will support OS/2 and Windows NT.

#### **Tangible Benefits**

The Moccasin approach gives Macintosh users, Apple, and Mac clone makers significant benefits.

Flexibility Moccasin-based Macs may seem nearly the same as their predecessors to most users, but one feature will distinguish them from any previous mainstream PC-open firmware, a specification that permits you to keep two, three, or even half a dozen operating systems on a hard drive; then when you start up, you pick which one you want to use. The Mac OS, OS/2, Windows NT, Solaris, Net-Ware, and AIX will all be ported to Moccasin. Intelbased systems also support numerous OSs but only let one system be installed at a time (with the exception that OS/2 and DOS/Windows can be loaded on the same hard drive and the OS can be selected at start-up). Apple also plans to offer standard Windows and DOS support as it now does: through addon cards and emulation.

Eventually, IBM and Apple intend to produce computers that can switch between OSs without restarting. These systems would put the first OS into a sleep mode that protects all preferences, application states, and documents by saving them to the hard drive, then activates the second OS. Such a system—and a more advanced design that could

allow simultaneous operation of more than one OS—will not be implemented in first-generation Moccasin machines.

Why is the ability to run multiple OSs appealing? Not many people outside of MIS directors, technology fetishists, and their ilk are likely to exercise the option. The reason has to do with hardware maintenance and staff training: relying on a single hardware standard for several OSs means less training for a technical-support team and end users, and fewer idiosyncrasies and unique problems to work through.

Moreover, if a company shifts resources—say, pares back its engineering staff but hires more graphic designers—rather than dumping Sun workstations and buying Macs, it could simply drop the Mac OS and ROM into the former engineering machines.

Most important, open firmware makes PCI addin cards OS-independent—a capability that Intelbased PCs do not support. This will let companies standardize on, say, one kind of network interface card, regardless of which OS is loaded—saving both money and MIS-support time in the process.

Interoperability Guarantees Although spawned by the original IBM PC, Intel-based clones have frustrated many users because IBM neither owned its own OS nor had the power to require clone makers to adhere to basic hardware standards. The result: a sometimes chaotic assemblage of systems and peripherals that compares poorly with the Mac's plug-and-play ease of use.

As an OS-independent design, Moccasin should become the first fully unified standard in PC history—bridging gaps between Macs and PCs, multiple OSs, and peripheral devices. Interoperability and basic functions will be, in effect, guaranteed by Apple, IBM, and Motorola's license to the system maker.

**Economies of Scale** Standardization should help Apple achieve a fundamental goal: hooking corporate buyers. More than anything, Moccasin is Apple's final charge at enterprise computing.

Just as training and support can be complex and costly for a company that relies on a range of OSs, companies with cross-platform environments now pay dearly for dealing in relatively small unit volumes from a small number of suppliers. After shopping among a wide range of vendors, those buyers should realize steep volume discounts by purchasing nearly all computers from a single source, then plugging in whatever supported OS is required by each end user.

Those kinds of discounts will eventually filter down to add-ons; both Apple's Gable and Gary Griffiths, director of business development for IBM's Power Personal Systems, expect all the OSs ported to Moccasin to eventually take advantage of all Mac and PC peripheral-connection schemes. Thus OS/2

## The Anatomy of PC/Mac Convergence

The converged hardware reference platform (code-named Moccasin) will add key Macintosh components to the PowerPC Reference Platform (PReP) developed by IBM. This artist's concept shows the basic parameters of the new design, which is still being developed and will be published this spring. It highlights contributions from Apple's Power Macintosh design and new chips to be created for Moccasin. Mac contributions include the Mac ROM slot, ADB, auto-eject floopy drive, and Mac-style senal ports for GeoPort and LocalTalk.

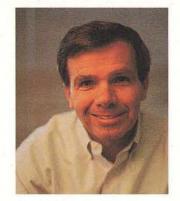
Moccasin will be designed for flexibility. Even standard features will be implemented in a variety of ways, depending on each system developer's strategy. RAM could be soldered onto the motherboard or add-

ed exclusively via slots. Likewise, PCI could be mounted onboard or implemented via slots. Moccasin will support ISA, NuBus, SCSI/IDE connector and SCSI expansion buses, plus IDE drives, **VRAM** slots all accessed via PCI; but not all developers will include them in their designs. Apple Soldered VRAM will probably support both IDE and SCSI; Mac video connector ISA support is being debated. VGA connector Soldered DRAM PowerPC 603, 604, or 620 Cache Mac ROM slot **DRAM** slots Floppy connector SCSI/IDE connector Memory and PCI controller NuBus (or ISA) controller PCI slots Ethemet NuBus (or ISA) slots GeoPort Combo Mac/PC I/O controller LocalTalk ADB Audio I/O

Derived from Mac Unique to Moccasin

might support ADB, while PC video vendors could take advantage of the Digital Audio Video (DAV) slot that Apple is adding to some of its forthcoming PCI Power Macs. (Ironically, in the process, the Mac's historic ease-of-use advantage vis-à-vis hardware would almost certainly evaporate, since Apple's hardware will be everyone's hardware.) Neither Gable nor Griffiths wants to see ports become ded-

#### The goal is a system that is



#### neither a PC nor a Macintosh, but one that combines the best of both

G A R Y G R I F F I T H S , director of business development, IBM's Power Personal Systems

icated to a single OS, since that would effectively segment the market based on the connectors installed and keep the common platform from being common.

Bigger Pie, More Products Apple and IBM realize that only a large market based on a unified platform can challenge Intel-Microsoft supremacy. Macintosh users have watched with dismay as, over the last two years, many formerly Mac-centric developers either released Windows versions of their products before equivalent Mac versions or moved most of their efforts to Windows. Many developers feel they have no choice but to develop for the platform that holds some 80 percent of the personal computer market. This exodus from the Mac is already choking off diversity in some Mac software and peripherals categories. Unchecked, it could strangle the Mac, as happened with other innovative PC alternatives, such as Amiga and Next.

Some analysts say that Apple and IBM can mount a successful challenge to Windows only by choosing a single OS to run on their new platform—a move neither company is prepared to take. The critics might be right, but Apple is betting that the converged platform and Mac OS licensing will woo back wayward developers and bring in new ones who see a Moccasin-based market becoming far larger than the combination of Power Macs and whatever PRePbased systems ultimately emerge.

If Apple is correct, the Mac market will come to resemble the PC market both in its vast range of system and peripheral options and in the buying channels available to companies and home users alike.

Glen Miranker, vice president of FirePower Systems, a PReP system-board maker that is expected to become a leading producer of Moccasin-based systems, puts it this way: "As spectacular a job as Apple has done over the years, an industry delivers better products than a single company."

#### Major Challenges

Moving from today's Power Macs to tomorrow's Moccasin system presents several difficult challenges for Apple to overcome. The promise of a converged platform is great, but the effort will be daunting.

Creating the Design Will the transition to Moccasin be smooth and rapid enough to begin to crack the Intel-Microsoft edifice before it becomes impenetrable? After all, Intel (despite the odd chip scandal) and Microsoft (despite legendary shipping delays) are hardly standing still. Apple's Gable argues that although the Mac differs significantly from Intel PCs, "the [technologies] that were gratuitously different have been wrung out of the Mac in recent years. PCs and Macs are not as exotically different than they were four years ago."

For example, NuBus served the Mac well because it was plug-and-play, in contrast to the standard PC buses, ISA and EISA, which were "plugand-play nightmares," says Gable. But expansion cards using the new PC bus standard, PCI, will soon also be the Mac standard. "Now with PCI, you can have Macintosh plug-and-play" and still use the same bus as the rest of the PC industry, Gable adds. Other Mac features, such as the auto-eject floppy drive, will become standard on the new platform, while Apple eliminated auto inject on recent Mac models.

Macs and PCs have begun to overlap in several other areas. SCSI has become fairly common among higher-end PCs, and Apple has begun using the standard PC IDE (Integrated Drive Electronics) drives for internal hard drives in some recent Macs. The Mac's serial connectors may have a different shape than a PC's, but serial devices like fax modems work on either computer with the right adapter installed. Ditto for monitors.

"In areas where there are likely conflicts, we will either choose one method or accommodate both options," according to IBM's Griffiths. "For things like the memory map, which are more fundamental to the design, it was decided that it was better to accommodate both. The goal is to have a system that is neither a PC nor a Macintosh, but one that combines the best qualities of both."

This accommodation can be a laborious process. "We've literally had to take Verilog microcode [which defines basic chip functions] from Apple ASICs and combine it with Verilog code from IBM chips and create completely new chips," says Gable. Refining the Moccasin design and developing the ASICs and device drivers will take several months at least. Moreover, the crucial notebook and server aspects of the Moccasin design lag six to nine months behind the desktop version. Every month that passes serves Intel and Microsoft's feverish efforts to refine their own technologies.

Moving the Mac OS Even so, Apple faces a larger

hurdle: porting the Mac OS to the new platform. Unlike Windows NT, the Mac OS is not based on a microkernel-a design in which modular core services are kept separate from the hardware the system runs on. For example, to an application program running on top of a kernel-based OS, the I/O interface would appear the same on an Intel-based machine, a Power Mac, and eventually a Moccasin-based computer. The I/O kernel accommodates interpretations for each hardware platform. The value of microkernels has become clear because the major OS developers are jumping on the bandwagon. Apple's next major OS revision, code-named Copland, will implement a microkernel. Meanwhile, IBM is working on microkernel-based successors to OS/2 and AIX, as is SunSoft for Solaris. The only major OS not moving to the microkernel approach is Windows 95.

Moreover, the Mac OS was deliberately designed to be as tightly integrated with Mac hardware as possible—partly to enhance reliability and performance, partly to frustrate would-be clone makers considering efforts to reverse-engineer the Mac. Therefore, the Mac OS will probably be the last of the announced OSs to be ported to Moccasin (Apple estimates it will happen in late 1996), with the first Mac OS—based machines following as much as a year behind those based on other OSs. That delay could cost Apple a critical jump on the emerging market.

Maintaining a Unique Mac Once the transition has been completed, Apple—and other Moccasin developers who license the Mac OS—won't face much of a challenge from other OSs, such as OS/2 and Windows NT, that will operate on Moccasin. Of those OSs, the Mac OS is now the only mainstream system. Of course, if OS/2 Warp gains in popularity and if Windows NT is accepted outside of the engineering and server markets, the Mac OS may then have serious competition. The "outside" competition will be Windows 95 machines. The most intense competition will be from Moccasin clones using the Mac OS (see "Competing Against Clones").

#### **Chances for Success**

As the Newton experience, for one, so painfully shows, Apple is not always the most reliable prognosticator of sales totals. How likely is Moccasin to increase the Mac OS market share and thereby ensure its future, whoever makes the box itself? Several key factors look auspicious.

Working Together Apple, IBM, and Motorola showed that they can cooperate effectively in the development of the PowerPC chip—a good sign for Moccasin's technical development. And they have reached some sensible conclusions about how to structure the business side of Moccasin, particularly royalty-free licensing and the plan to select most parts from standard PC inventories. Those moves should keep manufacturing costs and consumer prices competitive.

Clear Standards As with any diverse market,

#### FirePower: First Converged-Platform Maker?

WHEN APPLE, IBM, AND MOTOROla introduced their converged platform last November, an obscure, small company called FirePower Systems took a surprisingly prominent role in the proceedings. FirePower executives confidently predicted that they would ship converged platform—based computers within 90 days of when the platform specification is published sometime this spring.

The Menlo Park, California, start-up has only 70 employees, but it's already making a big impact in the industry developed around PowerPC microprocessors, and it may play a key role in making the converged platform, codenamed Moccasin, a success.

Although small, FirePower is a major developer of system boards and complete systems for IBM's PowerPC Reference Platform (PReP)—the design Apple rejected in favor of Moccasin. FirePower sells systems only to other computer companies, which resell

them under their brand name.

"FirePower has been very active in defining the PReP specification," says Gary Griffiths, director of business development for IBM's Power Personal Systems. "However, when they went to do their own PReP product, they chose not to use a chip set from either IBM or Motorola, but went to their own chip set that was compliant with the standard but better for their purposes."

FirePower should likewise be a key player in helping to refine the converged platform. The company expects to follow its PReP approach with a Moccasin-based machine—developing its own chips that conform to the specification but that also fit the specialized needs of its customers.

Also, as it has done in its PReP development, FirePower will avoid the PowerPC 601 CPU and instead move directly to 603- or 604-based Moccasin systems. Because those systems will be among the first on



current systems already use the PCI bus and open firmware two key design elements of Moccasin. It also helps that the small company has deep pockets courtesy of its big partner, Japan's Canon.

GLEN MIRANKER, vice president for hardware engineering at FirePower Systems (left), and JON RUBINSTEIN, chief operating officer, both came out of top hardware jobs at Next Computer.

the market, FirePower could have significant influence on other system designers.

FirePower can move so quickly, in part, because its experience with PReP—which forms the basis of many aspects of Moccasin—has given it a running start. "We're doing our development work while the converged spec is under development," says Glen Miranker, Fire-Power's vice president for hardware engineering. And FirePower's Within about a year after Fire-Power's first systems become available to developers, look for Moccasin-based systems to emerge from IBM, Motorola, Power Computing, and Apple, among others. Miranker welcomes the competition as a way to establish the platform as a serious standard. "All of the participants in this business are counting on being fellow travelers in a very large business," he said.

### Competing Against Clones

HOW WILL APPLE HANDLE THE "inside" competition—Moccasin vendors licensing the Mac OS for their systems? Could Apple get lost in its own rush? How will it maintain enough distinct qualities to avoid being overwhelmed by the industry it created?

"Apple will be the standard that people compare any Mac to, of course, but what we're seeing already with people coming out with Macintosh-compatible machines, is that everyone is trying to distinguish themselves from Apple," says Apple's Jim Gable.

To a degree, Gable is undoubtedly right. The Moccasin/Mac OS market will probably replicate the rapidly evolving Mac-clone market of today, which is itself no more than a bridge to the converged plat-

form. Specialty players, like Radius, will probably provide turnkey solutions for video and authoring. Power Computing may use its current Mac-clone business to jump-start an effort to become a mail-order Mac titan, the way Dell did in the PC market.

But the converged platform will make it economically feasible—perhaps irresistible—for the largest computer makers to go head-to-head against Apple. The Mac OS market could grow considerably without much guarantee that Apple will grow its own share of computer sales. The Mac could succeed as a platform without enriching Apple, but Apple will still have to find the resources to pay for future Mac OS development.

expect some junk among Moccasin-based computers; but the licensing agreement will require developers to keep incompatibilities to a minimum. Meanwhile, Mac consumers will benefit from the innovations of a wide range of system makers.

The 32-Bit Edge Moccasin holds what may prove to be a key advantage over Windows machines. All the OSs that will run native on Moccasin process information in 32-bit chunks, rather than 16-bit chunks as Windows 3.1 does. But Windows users will make the 32-bit transition with either Windows 95 or Windows NT, and this transition could present problems for Windows users.

Incompatibilities will probably crop up with drivers and programs that rely on low-level system calls rather than high-level hooks into OS components like the Graphical Device Interface, the Windows equivalent of QuickDraw. Windows 95 has been delayed, in part, to avoid such problems, which are stunningly diverse given the vast array of Windows-based peripherals and applications. Significant incompatibilities could require users to replace software and even some peripherals. The first version of Windows NT was hobbled in part because it could not provide sufficient compatibility with many standard Windows drivers. Apple hopes that a Moccasinbased machine with Mac and PC capabilities will appeal to some Windows users, especially if Microsoft botches its Windows 95 rollout.

Selling to Strength Apple would like to sell many more computers, and it will, no doubt, market its machines aggressively. But Apple's Moccasin strategy probably need not depend on selling many more of its own computers. Apple may instead be contemplating a software and peripheral strategy.

In the past, Apple was often first with new developments—from the graphical user interface to QuickTime—that led the entire PC industry. Consider how the Power Macs have left IBM, which has yet to release mainstream PowerPC-based systems, in the dust. Consistent with that pattern, look for Apple to service the converged platform with new technology, particularly in its historic strongholds and where it still arguably holds a technology lead over Windows machines: AV and multimedia; color publishing; plug-and-play peripherals; object technology and component software; device-independent, Newton-like personal-digital-assistant software; and if it doesn't lose the initiative to Microsoft, OS ease of use.

Apple could become the first among equals in an effort to make Moccasin not only the most flexible and reliable mainstream PC platform, but also the most advanced. It could sell a respectable number of Macs—perhaps at or slightly above its current market share—then make its real money selling software, peripherals, and incremental system enhancements to the entire Moccasin-based industry. You can see a glimmer of this in the strong sales of Apple's Imaging Division, which today sells printers, monitors, and scanners to both Mac and PC users.

Look for Apple to come out with an array of PCI cards and to extend its monitor, printer, and scanner lines in two stages—first, after PCI Macs come out, later this year, then when Moccasin-based Macs become available. And don't be surprised when Apple eats some of its young. If the Mac OS market becomes big and entrenched, expect to see Apple cannibalize profitable, high-end market segments. For example, if Radius develops a successful clone for video editors and multimedia producers, Apple might sell AV workstations bundled with RAID systems, just as it squeezed out all significant licensed competitors in the accelerator market last year by offering cheap PowerPC upgrades.

#### The Last Word

IBM and Motorola are staking a great deal on the converged platform; Apple is betting its life. But it's a good bet for the Macintosh user. Apple executives probably suffer from nightmares of their company drained dry in a war against cutthroat, cut-rate clone makers—a kind of Frankenstein-Mac effect. Yet even in that worst case, Apple should survive as long as it remains the sole or primary innovator for the Mac OS. If Apple stumbles in a big way, it will have no choice but to seek help in developing the Mac OS to ensure its survival. Either way, if the converged platform succeeds, the Mac OS should thrive.

Moccasin will mean that eventually it won't much matter whom you buy your Mac from. For the Mac consumer, tied to Apple for all these years, for better or worse, richer or poorer, this is a divorce made in heaven.

Senior editor CHARLES PILLER reports on Macintosh clones and the impact of technology on public affairs and public policy.



Helpful advice.



Stock updates.



Hourly weather updates.

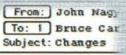


Consumer Reports online.



A friendly interface.

#### WHY JOHN NAGY'S MAC LOVES COMPUSERVE.

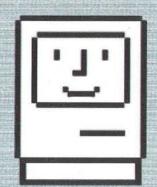


John:
How are you doin
now I'm afraid thanything importation think about this

E-mail.



Shopping.



Gardening Forum.

Airline reservations.



Over 20 Mac forums.



Virus updates.



Science Fiction and Fantasy Forum.



Downloadable programs.



Desktop publishing assistance.

It's because CompuServe makes John's life so much more exciting.

John talks with friends all over the world about everything from gardening to how to connect his printer. He meets far more, and far more interesting, people than he's ever met before. He shops for clothes,

tries software demos, and checks the weather where his sister lives. He even learns new and better ways to use his Mac in CompuServe's Mac forums.

All this excitement makes John happy, and keeps John's Mac busy. Which is why you should contact CompuServe too, at 1 800 881-8961 (614 529-1349 for international inquiries) for your free CompuServe membership kit. Because, as we all know, a busy Mac is a happy Mac.



The information service you won't outgrow.

Circle 66 on reader service card

## Meeting the users \$4749; 515/221-1801), Lotus De-

Challenge

Electronic mail has wedged itself firmly into the consciousness of most Mac users. The easily realized benefits of internal electronic communications sent E-mail into the limelight, while the potential for fast and easy communication with the rest of the world over the Internet added a million watts of bright white spotlight.

The goal of having an organizationwide E-mail system bring easy communications to everybody's desktop looks good in a strategic plan, but network managers charged with making it happen have their hands full. Building large E-mail systems often involves making separate systems interoperate, share directory information, and work across different platforms.

I looked at the problems companies have in building large E-mail networks and the software tools that are available to solve them. The news is good: large E-mail networks that work well are possible. By finding the right software tools, spending time planning, and making a few compromises, network managers can build enormous networks that work.

BY JOEL SNYDER

#### Challenge One

SCALABILITY

Ask most organizations about their Macbased E-mail, and you're likely to hear about CE Software's QuickMail (100 velopment Corporation's cc:Mail (server software \$95, 100 users \$4760; 415/961-8800), and Microsoft Mail (server software \$269, 100 users \$3659 estimated retail price; 206/882-8080). According to the market-research firm International Data Corporation, this trio accounts for more than 6 million mailboxes on PCs and Macs. The three packages use a similar paradigm for electronic mail. A client user on a Mac or PC connects to a server (called a post office or mail center) to retrieve, send, and file electronic mail.

End users of these applications appreciate the interfaces that make organizing mail and sending documents simple. Training costs are low, but experienced users may find these interfaces limiting.

Network managers aren't so happy with the server side of the LAN-based E-mail equation. Mac and PC E-mail systems are designed for small networks with only a few users. Once the mailbox count jumps to 500, let alone 5000 or 50,000, most products begin to break down.

E-mail is a disk-intensive and network-intensive application. An E-mail user can easily send and receive 20 to 100 messages a day. Multiply that by a couple hundred users, and you'll never get a single AppleShare server to handle the kind of load E-mail demands. Apple's highspeed servers, such as the Apple Workgroup Server 8150, just can't move more than about 500 kilobytes per second through the Macintosh Operating System, the AppleShare software, and the AppleTalk protocol stacks.

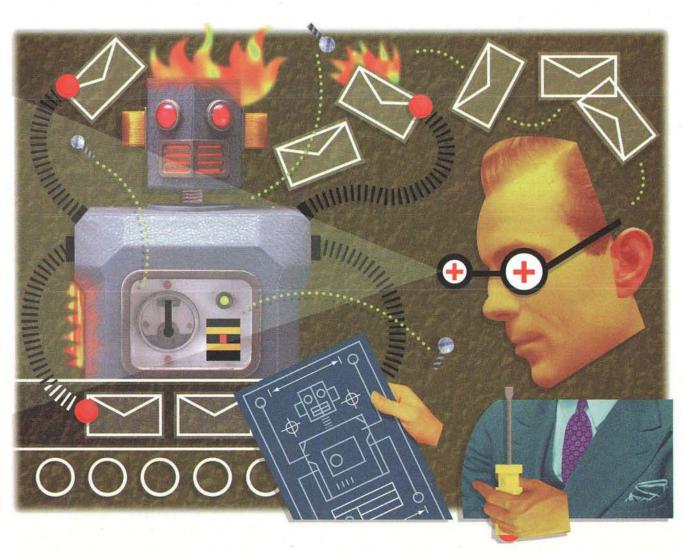
For realistic response time, even high-speed servers should be limited to between 20 and 150 active E-mail usersfewer if you use E-mail to move large files around. If you've got an active user community larger than that, plan for multiple servers now. Don't try to save money on your server—this is one place where speed really does count. For best results, choose an Apple Workgroup Server with two SCSI buses and install the RAID software that comes with the server, spreading the load across the two buses. In my tests using Apple RAID in dual-SCSI configurations, E-mail server response time improved by between 9 and 12 percent. (For more information about RAID, see "The RAID Option," in this issue.)

These basic architectural limitations aren't the only things holding back performance. Although vendors use the terms client and server, this isn't true client-server computing: the E-mail server is typically little more than a file server, and the clients use it primarily as a shared storage medium. So instead of asking for and receiving a message (as would happen in a true client-server scenario), the steps involved in getting a message might be opening a directory, then reading the

directory, closing the directory, opening a file, reading the file, and closing the file. This puts a tremendous load on the file server, as it responds to low-level requests for disk services rather than high-level requests for E-mail messages.

File servers handling mail are also heavily stressed if you use your E-mail network to share files. To keep performance high, teach users to use shared disks on a file server or with System 7 file sharing, public folders, and folder protections—instead of E-mail—to distribute large documents. Also consider providing people who share large documents or who work on group projects, with alternatives to E-mail such as On Tech-

## TOP STRATEGIES to ensure your E-mail system keeps up as your network grows



nology's Instant Update (\$495; 617/374-1400) or Pacer Software's PacerForum (\$549 for five users; 508/898-3300).

E-mail vendors use a not-reallyclient-server approach because the E-mail market demands it: vendors are writing for the personal-computer market, where a network of 20 workstations is much more common than a network of 200, and network managers prefer an E-mail server that sits easily on their existing Apple-Share server. This isn't some hidden truth. When I tested Microsoft Mail, cc:Mail, and QuickMail, the vendors gave me frank admissions about the capacity limits of their products. For tips on preparing for growth with each of these E-mail systems, see the sidebar "Tips for Growing E-Mail Networks."

Single-Post Office Approach Once you have more than a few hundred users in a single location, you can either increase the number of post offices (servers) or find software (not QuickMail, cc:Mail, or MS Mail) that can handle a single large post office. Although scaling up by adding post offices looks attractive-because it includes known servers, known clients, and existing practices—the cost for adding and maintaining many sites is higher than that for making the leap to a different E-mail system: a true client-server system costs less per user to own, manage, and operate. However, this cost shows up as one huge budget item rather than as lots of little budget items.

One way of stretching the single-post office option is to move out of the Apple-Share arena and into a faster, AppleTalk Filing Protocol (AFP)-compatible server. For example, Windows NT's built-in file server offers higher performance than AppleShare does on equivalent hardware. In fact, when it ships, the Microsoft Exchange Server, the next-generation server for MS Mail, will require a PC running NT Advanced Server (NTAS) 3.5.

Digital Equipment Corporation's (DEC) TeamLinks (\$52 to \$80 per user; 508/493-5111) client-server E-mail system is designed to support thousands of users, including Mac, Windows, DOS, dumb-terminal, and X window system users. The TeamLinks server, called Mailworks (starts at \$930), runs on Unix and OpenVMS. Clients connect via DECnet, TCP/IP, or dial-in.

DEC plans to provide client-server access to LAN E-mail systems, such as cc:Mail and MS Mail, by letting existing clients plug into a Mailworks server. This would combine the advantages of a high-performance mail server with a familiar user-interface. Unfortunately, the Mac versions won't ship until later this year.

If you're considering using another

platform such as Unix for the server, check out Eudora, from Qualcomm (for 2 to 49 users \$45; 619/587-1121), which has mail clients for Macs and Windows PCs. Eudora's automatic filtering and categorizing of incoming E-mail messages equals that of the most sophisticated filters of the Mac E-mail systems.

more than three post offices, you should immediately begin to investigate an E-mail backbone. Unlike gateways, which require one-to-one connections between systems, every E-mail post office connects to the backbone directly, and all E-mail travels over the backbone.

Electronic-mail backbones are partic-

#### **Comparing E-Mail Architectures**

Number of Users	Post Office	Server Operating System	Type of E-Mail System	Cost per User	Scalability
10	single	Mac	file-based	low	low
100	single	Mac	file-based	low	low
	single	Windows NT	file-based	medium	medium
1000	multiple	Mac or other	file-based	medium	medium
	multiple	various	various file-based systems; gateways	high	low
	multiple	Mac or Windows NT	various file-based systems; backbone	medium	high
	single	Unix or VMS	client-server	medium	medium
10,000	multiple	Mac or Windows NT	various file-based systems; backbone	medium	high
	multiple	Unix or VMS	client-server; backbone	low	high

Multiple Post Offices In many cases, more than one post office (or server) is required. Geography, lack of resources, and an installed base of different mail systems are all factors that might necessitate a multiple–post office network. When many employees are spread across many locations, but no single location has more than a few hundred users, a single post office is not cost-effective.

If you must break up your network into multiple post offices, put as many users as possible on each to keep management costs down. When you need to link only one or two E-mail post offices from different kinds of E-mail systems, gateways can accomplish the task.

With the various gateways that are available you should be able to build a system that can link most Mac-based E-mail systems to each other. Many vendors—for example, Microsoft—sell gateways for their E-mail packages. But in my experience, third-party gateways—particularly those to SMTP mail—are more reliable, easier to manage, and offer better support than the gateways offered by the mail-package vendors. The reigning royals of the third-party, Mac E-mail-gateway business are StarNine Technologies (510/649-4949) and InterCon Systems Corporation (703/709-5500).

As the number of E-mail servers grows, gatewaying from post office to post office becomes a nightmare of configurations and customizations. If your E-mail network looks like it will ever have ularly useful when you need to link heterogeneous E-mail systems, because backbones solve not only scalability problems but also interoperability problems.

#### Challenge Two

#### INTEROPERABILITY

Very few large E-mail networks are composed of just Macintosh users. Large organizations tend to grow computing systems over time, and users are loath to give up what they're used to. This means that a network manager trying to build an organization-wide E-mail system may have to link E-mail from minicomputers and mainframes. Even if the plethora of mainframes have been banished to computing purgatory, the problem of multiple personal computer E-mail systems often raises its ugly head: any site with thousands of users has streams of parallel evolution that guarantee the need to link personal computer systems.

Add to this mixture some links to the outside world of the Internet, X.400, and other public E-mail systems, and you'll find that interoperability is more difficult than E-mail vendors make it sound.

Building a Backbone To build an E-mail backbone, you need to find a backbone that can connect to all of your E-mail post offices.

Mac network managers won't be happy to hear that the core software from backbone vendors requires a Unix or OpenVMS minicomputer. However, minicomputers offer advantages. Because these platforms run multitasking operating systems, a good backbone won't have to stop all E-mail to deal with a long or complex message. Backbones are responsible for document conversion between different E-mail systems, a task best done in the background. Also, only minicomputer backbones provide in-depth logging

#### Challenge Three

#### DIRECTORY SERVICES

One benefit of an electronic-mail system is a unified directory of users, but managing E-mail addresses is a problem when multiple E-mail systems are involved. Microsoft, CE Software, and Lotus all support directory synchronization for

Compatibility with Other E-Mail Systems	Installation	Management	Performance	Comments
low	easy	easy	high	Easy way to start.
low	easy	easy	low	Barrier to growth.
low	average	average	high	Management somewhat difficult.
low	easy	average	low	Total cost high but hidden.
medium	difficult	average	medium	Significant barrier to growth.
high	average	difficult	medium	Good with Internet, X.400, and fax links.
low	average	average	high	Easiest directory services for this net size.
high	average	difficult	medium	Workgroup managers control local networks.
medium	average	average	high	Typically single-vendor solution.

facilities that allow you to trace a message's path through a system step-by-step.

The following are the leading companies' personal computer E-mail backbone products, along with entry-level prices: Alisa Systems' AlisaMail (from \$10,000; 818/792-9474), The Boston Software Works' InterOffice (from \$4500; 617/482-9898), Control Data System's MailHub (from \$20,500; 612/482-6736), Hewlett-Packard's OpenMail (from \$144 per user; 800/637-7740), Innosoft's PMDF (from \$6000; 818/919-3600), Wingra's Missive (from \$6000; 608/238-4454). All of these vendors support MS Mail and SMTP. All except Control Data support cc:Mail. Only Alisa Systems and The Boston Software Works support QuickMail. Most of the vendors support X.400 and Novell MHS.

Choosing a backbone vendor can be treacherous and expensive. The lists of features, platforms, restrictions, and options are complex and confusing. Each product takes a slightly different approach to moving E-mail into the backbone. Little features such as document conversion can turn into major stumbling blocks if the software doesn't support the document types you need. For more about finding the package that is right for you, see the sidebar "Picking a Backbone."

In my experience, E-mail backbone products from Alisa, DEC, and Innosoft provide the best management and user interfaces and the greatest compatibility with a wide range of E-mail systems.

their own post offices but don't give you any help with a heterogeneous environment. If you insist on having one organization-wide E-mail directory, be prepared to spend time and money to run it.

One mistake many organizations make is trying to make E-mail addressing as simple as knowing a person's name. As the number of E-mail users grows, this scheme backfires because names are not enough to uniquely identify individuals. To avoid this problem, add location-specific information to E-mail addresses.

Resist the temptation to attempt to include the corporate power structure in your E-mail addresses. If a dozen departments all coexist on the same E-mail server, assigning addresses based on who works for which department is unnecessary micromanagement—and is likely to cause mishaps and waste time while network managers try to keep up with the fluid movement of people and names.

Another approach to directory coordination is to simply ignore the problem and not support a unified E-mail directory. Organizations with a decentralized structure, such as most universities, have taken this tack and ignored E-mail directories or maintained them on paper or in a separate, uncoordinated database. In companies where users don't need coddling and can handle a few bounced E-mail messages, this is cost-effective. Directoryless E-mail is also good preparation for interaction with the Internet, where directories are few and far between.

#### PICKING A BACKBONE

- Know exactly what systems you have to link. Are post offices running on Mac or PC servers? What network transport do you use? Does the vendor support exactly that configuration?
- Know your applications.
   What kinds of documents are people mailing? Can the vendor convert between all of those types correctly? Insist on a demonstration using your documents.
- Know your hardware. Some backbones are hardware-software solutions; others are just software. If you already have Unix or OpenVMS systems, pick a server that will run on those. Most turnkey systems aren't as maintenance-free as vendors promise.
- Know your E-mail style. All backbones use some protocol internally to communicate; usually it is TCP/IP's SMTP/MIME (Simple Mail Transport Protocol/Multipurpose Internet Mail Extensions) or X.400. If the backbone's protocol is proprietary, choose another vendor. If you use a lot of SMTP or X.400, pick a backbone that matches your E-mail style. If you would use X.400 only to communicate across the backbone, you're probably looking at too complex a system.
- Know your vendor. Some integrate products from different companies. That can mean technical-support headaches when you have a problem. If you can get everything directly from the developing company, you'll get problems solved more quickly.
- Know your budget. Each backbone has different pricing. How much does it cost to add post offices and backbone nodes?
- Know your growth path.
   Macs should be able to connect directly to the backbone using a client-server protocol such as X.400 or POP3/SMTP.
- Know your buzzwords. If the vendor supports X.500 directory services or the emerging MADMAN (the Internet's Mail and Directory Management) management standards, it's a good sign. Any vendor you pick should support SMTP and MIME and have a gateway to X.400.

#### TIPS FOR GROWING E-MAIL NETWORKS

#### CE Software QuickMail

- Assign each department to its own mail center, but consolidate multiple mail centers on a single mail server to keep the number of users at around 250 per server.
- The ideal QuickMail server is a Quadra 800 or 900 system that
  has lots of disk space and is running System 7. QuickMail
  doesn't run on A/UX-based servers and won't run on Power
  Macs until the networking system software runs natively,
  according to CE Software.
- The biggest problem in large QuickMail networks is the surfeit of mail that users don't delete from the server. QuickMail has no automated archiving tools, so you need to keep a close eye on disk space and train users to delete or move mail once they've read it.
- For best directory synchronization, use StarNine Technologies' MailLink Directory Services (\$2995).

#### Lotus cc:Mail

- Read the company's cc:Mail Router Administrator's Manual, which is the best document on building cc:Mail networks of any size. cc:mail Router (\$95) is the add-on software required for a multiple-post office network.
- Don't use peer-to-peer communications; establish a central cc:Mail router and post office to poll the other post offices.
- Keep post offices at around 150 users, certainly no more.
- OS/2 reliability has greatly improved; use OS/2 to run multisession cc:Mail Router and cc:Mail Mobile for Mac (\$195, add-on software for remote users).

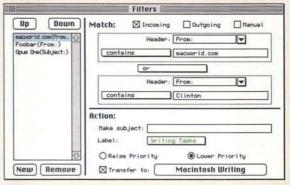
#### Microsoft Mail

- A Windows NT post office on a fast server can handle about 200 users, no more.
- MS Mail on a Macintosh server has a much nicer user interface than on a PC server, but Microsoft will not upgrade the Mac server. Use the uglier but speedier PC-server version for a large network.
- Microsoft no longer offers any free phone support for its advanced-system products. Check in often with its fax-back service (800/936-4400) and CompuServe forum to pick up bug-fixes and updates.

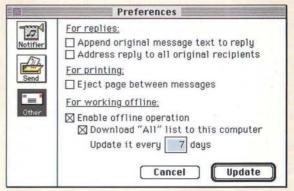
#### Any Mail System

 When you install client software, you should make it as easy as possible to update it later via electronic software distribution, remote-management software (such as Farallon's Tim-

- buktu Pro, \$199; 510/814-5000), or Apple events.
- Use remote-management software to manage servers.
- Watch distribution lists, which can eat up your network if they're misused.
- Preconfigure clients to delete the text of the original message in replies as a default. Use ResEdit if you have to.
- If you have an Internet connection, provide alternatives (such as a conferencing system like Pacer Software's PacerForum) for users to read Internet-based mailing lists. Otherwise, you could end up with 20 copies of the same mailing list sending 1000 messages a day into your E-mail system.



**Filter Messages** Qualcomm's Eudora lets you filter messages based on header content, such as the sender's address.



Less Text, Less Traffic To cut down on the size of messages, preconfigure clients to delete the text of the original message in replies. To do this in Microsoft Mail, uncheck "append original message text to reply" under preferences.

Building a single directory across heterogeneous E-mail systems requires software to collect and reconcile directory information. Most E-mail backbone vendors include software and tools for maintaining a unified directory. For a backboneless environment or one where the backbone vendor doesn't support all your E-mail systems, use directory-synchronization software. StarNine Technologies offers Mac-based MailLink Directory Services (\$2995). Hitachi Computer Products offers Unix-based SyncWare (starts at \$4995; 408/986-9770).

If directories are important to you, insist on support for X.500, the ITU-T

international standard for distributed directories. By storing your E-mail directory in an X.500-compatible format, you will easily be able to share it with the outside world when you link your organizational E-mail systems to the Internet or to a public X.400 E-mail network.

#### The Last Word

Building large, integrated E-mail systems requires planning with a corporate scope. It's equally important to set users' expectations early on. Large heterogeneous E-mail networks can be just as reliable and powerful as small systems if you pick the right E-mail backbone partner. You

will find that some of the features of small networks, such as unified directory services and nearly instantaneous delivery of messages, may not be possible or desirable in larger networks. By planning and setting expectations, you can ease the growth into a true organization-wide E-mail system. **m** 

JOEL SNYDER (jms@opus1.com) is a senior partner at Opus One, a Tucson, Arizona, consulting firm that specializes in the problems of building large networks. His book, Macworld Networking Bible, second edition (IDG Books Worldwide, 1994), coauthored with Dave Kosiur, has a chapter on E-mail integration for Mac networks.

## SILAINS

STATISTICA/Mac™ A complete statistical data analysis system with hundreds of presentation-quality graphs integrated with all procedures In-depth, comprehensive implementations of: Exploratory techniques; Descriptive statistics; Frequency tables; Large selection of nonparametric tests; Stepwise multiple regression methods with extended diagnostics; General nonlinear estimation (with predefined or user-specified models); Logit/Probit analysis; General implementation of ANOVA/ANCOVA/MANOVA/MANCOVA (designs of practically unlimited complexity, repeated, nested, incomplete, random, changing covariates, contrast analyses, post-hoc tests, custom designs); Stepwise discriminant function analysis; Canonical analysis; Large selection of time series modeling techniques with forecasting; Factor analysis; Cluster analysis (incl. hierarchical, k-means, and 2-way joining); Reliability/Item analysis; Log-linear analysis; General survival/failure time analysis (incl. ife tables, group comparisons, and regression models); Distribution fitting (a large selection of continuous and discrete distributions); Curve and surface fitting and smoothing (incl. spline, DWLS, NEXP, and others); and much more Manual with comprehensive introductions to each method and step-bystep examples (Quick Reference booklet explains all major conventions); baloon help Extensive data management facilities: a super-fast spreadsheet of unlimited capacity with formulas (and Publish and Subscribe); merge/split files; 'double identity" of values (numeric/text); BASIC-like data transformation programming language; Import/Export data and graphs from Excel, STATISTICA/w and other formats Graphs integrated with all procedures (e.g., click on a correlation coefficient to produce the corresponding scatterplot and other graphs; click on a variable in the descriptive statistics table to produce a histogram and other graphs; click on an interaction effect in the ANOVA table to see a plot of nteraction) Large selection of 2-dimensional graphs: Histograms (incl. multiple, clustered breakdowns, overlaid functions), Scatterplots (incl. multiple, weighted frequency, smoothed, function fitting), Multiple line and Range plots, Trend plots, Standard deviation plots, Data sequence diagrams, Contour plots, Box-and-whisker plots, Column plots, Bar graphs, Double pie cbarts, Scrollable dendrograms, Two-way joining plots, Curve fitting plots, Distribution comparison plots, Range plots, Probability plots, Amalgamation blots, Factor space plots, Casewise outlier and residual diagrams, ANOVA interaction plots, Multivariate (multiple) matrix plots, exploratory Draftsman plots with bistograms, categorized (multiple) graphs, and many other specialized plots Large selection of 3-dimensional graphs: 3D surface plots (with data smoothing procedures, color or gray-scale shading, and prolected contours), 3D scatterplots, 3D block scatterplots, 3D axis (space) plots, 3D spectral plots with adjustable planes, 3D line/ribbon plots, 3D sequence block plots, 3D bistograms, 3D surface-smoothed frequency plots, and 3D range plots ("flying boxes") All 3D plots displayed in true perspective, feature interactive real-time rotation facilities (incl. continuous rotation) Extensive graph customization options: all structural aspects of graphs (axes, scaling, patterns, colors, sizes, styles, regions, perspective, rotation, fitted func-tions, etc.); MacDraw-style tools with specialized "objects;" hi-res. graph and artwork embedding; page layout/preview; dynamic rulers ■ All output displayed in Scrollsheets™ (dynamic, internally scrollable tables: all numbers can be instantly converted into a variety of on-screen customizable, presentation-quality graphs) 
All contents of Scrollsheets can be saved as data and used for input, or be exported Flexible facilities to perform analyses on specific subsets of data ■ Extremely large analysis designs ■ Unlimited size of files ■ Extended precision Unmatched speed (e.g., on a Mac IIfx, arbitrary rotation of a surface with 1000 points takes 1 second; correlation matrix 50x50 with 100 cases—less than 3 seconds; transposing a 5000 data points file—less than 2 seconds) Full support for System 7 ("savvy") incl. Publish and Subscribe, Apple events, balloon help, "drag and drop," 32-bit, etc. Price: \$695.

Quick STATISTICA/Mac™ A subset of STATISTICA/Mac ■ All basic statistical modules of STATISTICA/Mac (Basic and Descriptive Statistics, Frequency tables, Exploratory data analysis, Nonparametrics, Distribution Fitting, Stepwise multiple regression; ANOVA/ANOVA) ■ Manual with comprehensive introductions to each method and step-by-step examples (Quick Reference booklet explains all major conventions) ■ All data management facilities of STATISTICA/Mac (including interactive rotation of all 3D graphs, extensive on-screen graph customization facilities) ■ Price: \$395.

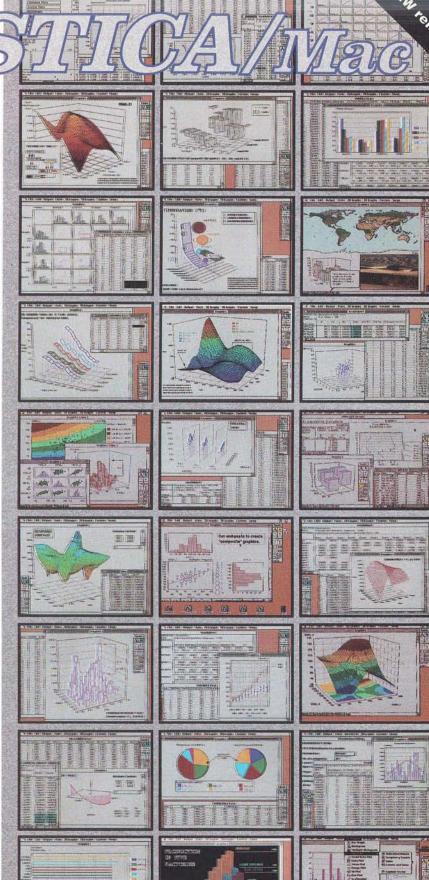
Windows versions also available (can exchange data with Macintosh versions): STATISTICA/w<sup>™</sup> \$995; Quick STATISTICA/w<sup>™</sup> \$495.

Domestic sh/h \$12 per product; please specify type of computer with order; 30-day moneyback guarantee.

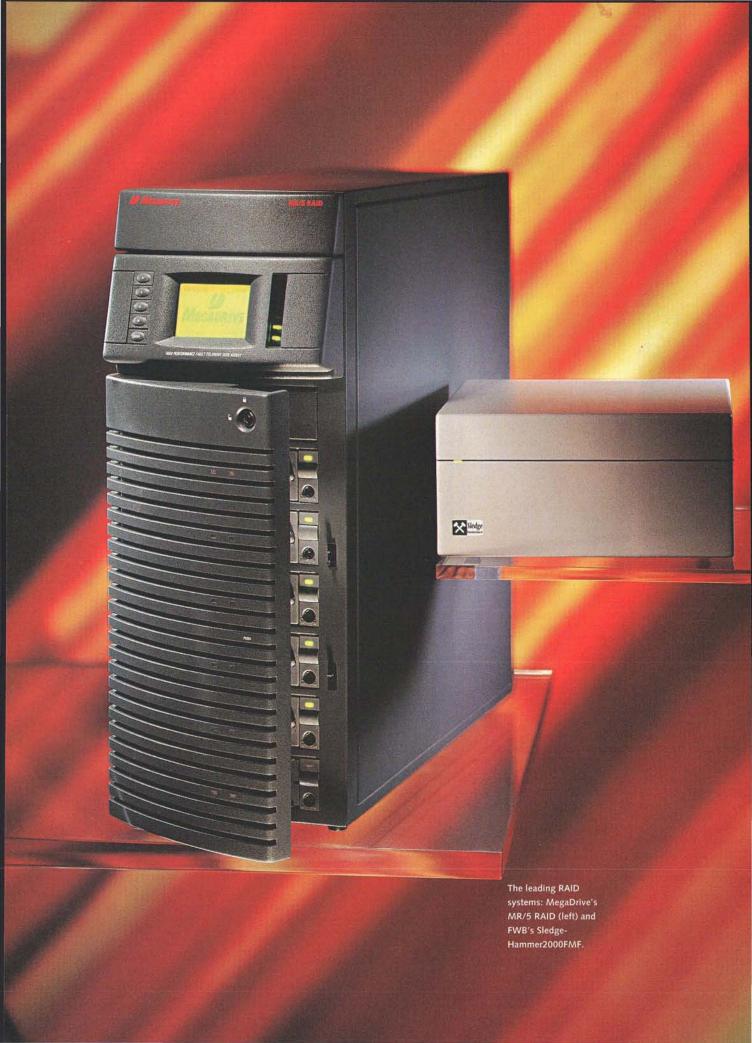
Circle 99 on reader service card

#### **StatSoft**

2325 E. 13th St. • Tuisa, OK 74104 • (918) 583-4149 Fax: (918) 583-4376



Overseas Offices: StatSoft of Europe (Hamburg, FRG), ph: 040/4200347, fax: 040/4911310; StatSoft UK (London, UK), ph: 0462/482822, fax: 0462/482825; StatSoft Pacific (Melbourne, Australia), ph: (03) 663 6580, fax: (03) 663 6117; StatSoft France (Paris), ph: (1) 45 66 97 00, fax: (1) 45 66 06 51; Available from other Authorized Representatives worldwide: Sweden: AkademiiData Scientific AB ph: 018-210035, fax: 018-210039; Finland: Statcon Gy ph: 24-334678, fax: 24-333867; Belgium: Texma Newtech 010 61 16 28; South Africa: Osiris Technical Systems 12-663-4500; Japan (Macintosh): Three's Company, Inc., 03-3770-7900, Japan (Windows): Design Technologies, Inc., 03-3667-1110.





# The second of th

MACWORLD LAB INVESTIGATES WHETHER RAID

DELIVERS ON ITS PROMISE OF FAST, SECURE STORAGE

Blinding speed or unrivaled data safety-RAID systems offer these promises. Speed for desktop video, editing or transferring giant Adobe Photoshop files, or searching massive databases; safety through instant ongoing protection of network storage or critical desktop data. We looked at 17 systems from 13 vendors to find out if RAID delivers on its promises. The answers we found surprised us, and they may surprise you. In many cases these highest of the high-end storage systems cost little more than standard storage solutions. But RAID is not always the right step, even for applications it was specifically designed around. For example, for desktop video, RAID may be a waste of money.

RAID stands for Redundant Array of Independent Disks. The original idea was to group relatively inexpensive drives as a single logical drive to achieve fault-tolerant data redundancy—the ability to recover data that would otherwise be lost by a failed drive—for less than the price of one comparable-size (large) hard drive. Originally five RAID configurations, levels 1 through 5, were defined. A newer version, data striping, or Level 0, offers some performance advantages over other RAID levels but no data redundancy—so technically it isn't actually RAID.

The basic components of a RAID system include two or more drives and RAID software. Most RAID systems also include one or more SCSI cards that improve on the performance of the Mac's built-in SCSI port. RAID 3 and 5 systems, usually intended for use on a server, often incorporate one or more hot-swap features-redundant power supplies, fans, or removable-drive trays that allow you to replace a failed drive (and reconstruct the data on the new drive) without shutting down the RAID system. (Among the drives we tested, the Mirror Precision 6, MegaDrive Systems MR/5 RAID, and Core International CoreArray 20000 included hotswap features. Direct Connections, La Cie, and MegaDrive all offer an optional integrated tape drive for even greater security.)

BY MATTHEW LEEDS

Five of the systems we tested (La Cie's Joule RAID, Spin Peripherals' RAIDline1, APS's Arraid, MaxConcept's SW-4100R, and FWB's SledgeHammer-2000FMF) supply RAID features through software alone. The rest also include one or more SCSI-2 cards in either a Fast or Fast/Wide implementation (see "Vital Statistics on Tested RAID Systems"). SCSI-2 Fast cards increase the throughput of the Mac's native SCSI port (the fastest Macs support up to 5MB per second, except the 8100-series Power Macs, which have an internal SCSI-2 Fast port) to a top speed of 10 MBps, while SCSI-2 Fast/Wide cards also double the number of data lines on the SCSI port, increasing the top speed to 20 MBps.

RAID as a Commodity

Despite the expense and complexity of RAID—or perhaps because of it—many of the products we tested rely on the same hardware and software. The 13 companies supplied only 6 different applications. MegaDrive and Core each use their own special RAID software to support advanced hot-swap features. Optima Technology also bundles its own easy-

to-use DiskArray RAID software, which offers impressive results. Optima's DisKovery 8200W running at Level 0 needed only 19 seconds to duplicate a 40MB file using the Finder, compared with about 29 seconds for a similar system, the Bottom Line Magic 4GB. Optima's DisKovery 8200W yielded substantially faster performance in all of the other tests as well. Both of these systems use two Fast/Wide SCSI-2

cards and two Seagate Fast/Wide drives that offer equivalent base performance.

Microtech International used version 2.0 of ExpressStripe from Atto Technology. ExpressStripe 3.0 did not ship before we completed testing, but 2.0 offered very good performance on most tests, though its interface was abysmal. For example, the list of partitions available for inclusion in an array appears in an obscure sequence of index numbers, not by volume name. We ran into serious problems with the Microtech systems on Photoshop tests—

discolored streaks on the screen and occasional crashes. This turned out to be caused by a bug in ExpressStripe 2.0 software. Atto says version 3.0 fixes the problem, and Microtech began supplying 3.0 shortly before we went to press.

FWB and Radius use FWB's RAID Toolkit, which is easy enough to install in an external array, such as the Radius Studio Array, but is painful to install in a dual-bus Macintosh. You must first install both drives on one bus to format them, then move one drive to the internal bus to set up the array. Of course, pain is a relative term, and nothing compares with communicating with the MegaDrive MR/5 and CoreArray 20000. For these you must use either a built-in LCD panel or a remote terminal session via telecommunications software.

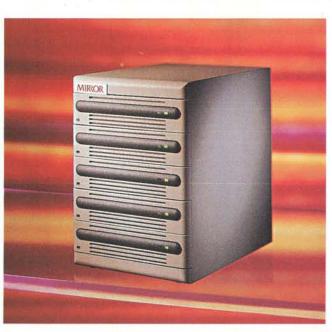
drives of different sizes, you can use just about any drives you have on hand. But without a SCSI-2 card and high-performance drives, you may not get the speed you're looking for.

We looked at ten systems that use SCSI cards—in all cases, either Atto's SiliconExpress IV or FWB's SCSI Jack-Hammer. Unlike the FWB SledgeHammer2000FMF, which relies on software alone and is designed for Macs with dual SCSI buses, such as the Quadra 950 or Power Macintosh 8100, the FWB Sledge-Hammer4100FMF-W uses the Jack-Hammer. Always verify that your vendor is shipping the latest firmware for the Atto card; using the current version should make a difference in performance and reliability. Both the FWB and Atto cards support SCSI-2 Fast and Fast/Wide.

#### WITHOUT A SCSI-2 CARD AND HIGH-

#### PERFORMANCE DRIVES, YOU MAY NOT GET

#### THE SPEED YOU'RE LOOKING FOR



Mirror's RAID systems, such as the Precision 6, feature unique slide-out trays that include both a drive mechanism and a power supply.

The eight other systems use Remus software from Trillium Research (715/381-1900): either Remus Limited (\$295), a version that supports only RAID 0 and 1, or the full version, which also provides RAID 4 and 5 (\$590). If you already own two or more drives, this may be far cheaper than buying a prepackaged RAID system. Since the Remus software supports

#### **Key Performance Factors**

To rank the RAID systems, the tests Macworld Lab used were searching a 4th Dimension database with nearly 100,000 records, opening and saving a 40MB Photoshop 3.0 TIFF file, and duplicating a 40MB file from the Finder (see "The Speed of RAID"). We also spot-checked an 80MB file duplication and ran a wide range of sustained-throughput tests. Although the data from those tests were too voluminous to show here, they validated the rankings shown in our benchmarks.

We ran special tests on three systems: the Mirror Precision 6, MegaDrive MR/5, and CoreArray 20000. Since these systems support one or more hot-swap features, we tested them by causing one of the drives in the array to fail and then adding a new drive and rebuilding the array. We also examined any additional hot-swap features.

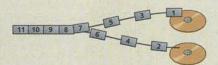
Ranking Configurations The testing established a few general principles to guide your considerations regarding hardware performance. All other factors being equal, RAID Level 0 arrays generally rank, from slowest to fastest, with the following bus connections: native Mac SCSI bus, dual native SCSI buses, one SCSI-2 Fast/Wide card (with Fast drives), one SCSI-2 Fast/Wide card (with Fast/Wide drives), and two SCSI-2 Fast/Wide cards (with Fast/Wide cards (with Fast/Wide drives).

For example, compare the performance of the Spin Peripherals RAIDline1

#### RAID BY THE NUMBERS

DATA PARITY INFORMATION

RAID 0 Sometimes called data striping, Level 0 combines two or more drives into a single logical drive. Data is written in segments to each drive in sequence. RAID 0 provides the fastest RAID systems, particularly when one or more of the drives use SCSI-2 cards. But the failure of any drive destroys the entire system's data.



**LEVEL 0** Data split across two drives. Key factors: fast and affordable, but half as reliable as a single drive.

RAID 1 Mirroring, or Level 1 RAID, writes identical data to each drive in a pair. One drive in the mirrored pair can fail and you lose no data. You can avoid the performance penalty for this safety by using two SCSI-2 cards (on any Mac with at least two NuBus slots) and connecting each drive to a separate SCSI bus—a process known as duplexing. Level 1 data redundancy comes at a high cost, since you must have twice the storage space your data requires. (RAID levels 0 and 1 can be combined to gain both speed and security. Such combined systems are sometimes called RAID 10.)

To get around the need to store duplicate copies of data for redundancy,

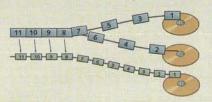


**LEVEL 1** Duplicate data written to two drives. Key factors: slow, high cost per megabyte, but secure against data loss.

all other RAID levels use *parity data* (a form of error correction) to reconstruct data from a failed drive. By comparing the data on the remaining drives in the array to the parity data, the RAID system can re-create the data on the lost drive. This works like solving for a missing variable in an equation. (For example, 2 + 3 = 5, where 2 and 3 represent data and 5 represents that data's parity information. Should the drive containing the 3 data fail, you could recalculate it in this fashion: 2 + x = 5, so x = 3.)

**RAID 2** RAID Level 2 is targeted at supercomputer applications; there are no RAID Level 2 implementations for the Macintosh.

RAID 3 RAID Level 3 retains a great deal of the performance of RAID 0, while reducing the high cost of data redundancy that is found in Level 1. RAID 3 requires a dedicated hardware controller



**LEVEL 3** Parity information stored on a separate drive. Key factors: fast for large-file transfers, lower cost for data security.

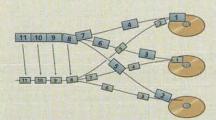
and a minimum of three drives with spin rates that can be synched. One drive is dedicated to containing parity data; the others are used to store data. The data is usually segmented at the byte level. All drives service a single read request, and all drives send their data to the controller in parallel. This offers high transfer rates for applications that move large files around—as is commonly done in prepress and video production. However, since all

drives are involved in every read or write, RAID Level 3 has a tendency to perform poorly in sequential input/output applications, such as transaction processing or database searches using extremely large files or when multiple clients access files simultaneously.

RAID 4 In an effort to solve RAID 3's problems with sequential I/O, Level 4 segments data at the block level rather than the byte level. This allows each drive to operate independently. RAID 4 improves read access but suffers from a write penalty since every write must access the parity drive.

**RAID 5** By eliminating the dedicated parity drive, Level 5 solves sequential I/O performance for both reads and writes. Data and parity are interleaved among all drives such that the parity data for a given set of drives is stored on the remaining drive. RAID 5 has almost completely wiped out the use of RAID 4. But RAID 5 is not as fast as RAID 3 with large files during writes.

Using RAID 3 and 5 amortizes the price of data redundancy by sharing it across a larger number of drives. But the dedicated controller required by RAID 3 systems makes them costlier than RAID 5. Costs are made higher still by hot-swap features, which are required by most users of RAID levels 3 or 5.



LEVEL 5 Parity information distributed across all drives. Key factors: fast for small transactions and database lookups, lowest cost for data security.

system, which uses the native bus of the Power Macintosh 8100, with that of the FWB SledgeHammer2000FMF, which uses the dual native bus of the Power Macintosh 8100. Both use nearly identical DEC drives, but the FWB system shaved 8 seconds off the RAIDline1's 39-second performance on the duplicate test and was significantly faster overall.

The MegaDrive MR/5 setup in RAID Level 0 was the fastest overall system, taking the lead in the 4th Dimension and Photoshop tests. Part of its advantage is due to its being the only system with a RAM cache—32MB in the unit we tested. It was slightly faster (except in the duplication test) than the two Optima systems, which delivered the next best overall performance, and were much more affordable. It's worth noting that only four systems cost less per gigabyte than the Optima DisKovery 8200W.

The La Cie Joule RAID and Direct Connections DC3400W also turned in noteworthy numbers. The Mirror Precision 6 and CoreArray 20000 performed relatively poorly, but because they offer hot-swap capability they should not be judged on performance alone.

We gleaned two other hardware generalizations from the Macworld Lab tests. In a database environment, the most cost-effective solution combines a single SCSI-2 Fast or Fast/Wide card and one or more DEC DSP3210 drives. These drives use internal caches optimized for small-file access, and these drives excel in database searches and sorts. Of course if you need the protection of true redun-

dancy, you'll want to set up either a RAID 1 or RAID 5 system.

Video Reality Test Many vendors say RAID excels at video capture. But because we requested that vendors send us generic systems that would be useful for a range of tasks, most products were not video-ready out of the box. Video capture requires setting drive parameters for things such as prefetch size and bufferfull ratios-low-level settings that most vendors pay little attention to.

Therefore, we tuned a cross section of the Level 0 drive and bus configurations to draw some overall conclusions about RAID video-capture performance. In general, we found that any properly configured RAID system—except a system relying on a single native NuBus (not using a SCSI-2 card) can capture digital

video at acceptable rates.

If you are working in a desktop video environment with VHS or S-Video-quality equipment, you may not need RAID at all. Macworld Lab tests (confirmed in conversations with technical staff at Radius) show that a SCSI-2 Fast/Wide card and the latest Seagate ST12450W drive can provide the 4 to 4.5 MBps datatransfer rate needed for this kind of work-anything more is overkill and a waste of money. But if you're working in BetacamSP, your target is 5.5 to 6.5 MBps. For this, you still need an array.

We also found that all the dual SCSI card systems we tested (two from Optima and one from Bottom Line) conflict with the Radius VideoVision Studio (VVS) card. The issue is bus contention. The VVS and SCSI cards demand access to the NuBus simultaneously. So far no one has been able to get dual SCSI cards to work properly with a VVS card. A similar problem can also crop up with some third-party sound cards.

A new version of the Bart chip, used to control the NuBus in Power Macs, may hold the key to solving this problem. The Power Mac 8100/110 has this new chip, Bart 21, but we were unable to obtain one for testing in time for this article. The 8100/110 uses a slower system bus (36.7MHz) than the 8100/80 (40MHz); hence the overall NuBus transfer rate on an 8100/110 runs about 8 percent slower. (It's even slower on an 8100/100, which uses a 33.3MHz system bus.) The speed difference derives partly from the slower bus speed, partly from synchronization overhead, because the 10MHz NuBus clock speed does not evenly divide into the 8100/110's system bus speed. But the release of PCI versions of the PowerPC, VVS, and SCSI cards later this year will also solve this issue, in that NuBus and its conflicts will become a thing of the past.

As you consider these test results, remember that the RAID systems we tested are representative of what's currently on the market, but they are not the only offerings available. You can usually request specific components to meet your performance and budgetary needs.

Performance Bottlenecks Also, take advertised performance specifications with a grain of salt. While some vendors state specific maximum-throughput figures, real-world performance, particular-

#### AV DRIVES: FRAME-DROPPING PROBLEM SOLVED

You're just finishing a digital-video edit of an astonishing event. Your RAID system's high throughput is giving you great picture quality. But you suddenly notice that a few critical frames-the ones that show the UFO-

are missing. You've just discovered that sustained throughput isn't the same as uninterrupted throughput. Digital-video professionals need storage systems that don't temporarily stop processing data, thereby dropping frames.

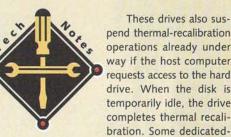
The problem is heat. As a hard drive generates heat, its platters and read-write armature expand at different rates. A drive must account for this expansion to ensure that the reading and writing heads remain aligned with the data tracks on the platters.

Many older drives briefly halt data flow every two to ten minutes to check and correct every head's alignment. This thermal recalibration can take 100 to 500 milliseconds, a delay that isn't noticeable in business and graphics applications that transfer data in small chunks. But for digital video, with its long continuous transfers, a pause could mean 3 to 15 dropped frames.

The solution is drives that smoothly adjust to heat. Manufacturers have two methods to correct for heat expansion without interrupting data flow.

One approach controls when recalibrations occur. Dedicated-servo drives use one side of one platter exclusively for all the drive's navigation data. When the dedicated platter's data head notices that the dedicated-servo data has shifted because of expansion, the data head adjusts the positioning of all the read and write heads on all the drive's other platters.

Since dedicated-servo drives must perform thermal recalibrations, companies that use them, such as Micropolis and Seagate, have developed systems that postpone recalibration while data is being written or read.



servo drives recalibrate only one head at a time. These drives never need more than a few scattered pauses in data flow to completely adjust for expansion.

The other method to ensure constant data flow is to eliminate thermal recalibrations altogether. Companies such as Quantum, IBM, Conner Peripherals, and DEC offer high-capacity drives that use embedded-servo technology-servo and user data are interleaved on both sides of every platter. The same head accesses both servo and user information, continually repositioning itself for temperature changes.

Macworld Lab found that arrays built with either embedded-servo or dedicated-servo drives could capture video without dropping frames.

Macworld Lab also captured video to a three-year-old 500MB Seagate ST1581 hard drive at its QuickTime data limit of 1.5 MBps. During 45 minutes of close observation, we found six instances of dropped frames, most likely due to thermal recalibration. But we had to concentrate to notice the disruptions-which suggests that thermal recalibration was never quite the problem some drive vendors have suggested.

While some older drives may create more glaring errors, the video the ST1581 produced would be fine for most corporate use-though broadcast video editors would complain.

So finding a drive without intrusive thermal recalibration is no longer a problem. Many vendors clearly indicate which of their drives are AV or multimedia ready. When shopping for a digital-video RAID system, first ensure that the drives don't drop frames and then look for high throughput.-Jim Feeley



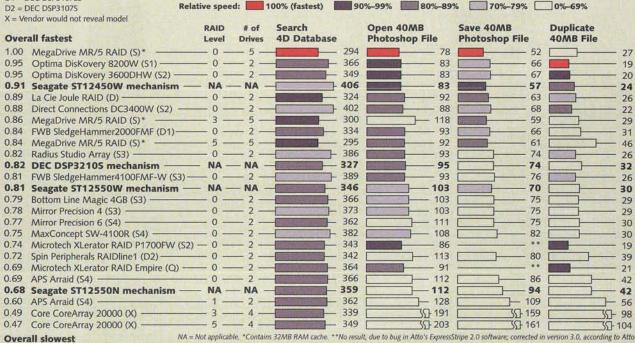
#### The Speed of RAID

#### Mechanism key:

- S = Seagate ST11950N
- S1 = Seagate ST15150W
- S2 = Seagate ST12450W
- S3 = Seagate ST12550W
- S4 = Seagate ST12550N Q = Quantum Empire 1080S
- D = DEC DSP3210S
- D1 = DFC DSP3107LS
- D2 = DEC DSP31075

The RAID systems are listed from fastest (top) to slowest (bottom). Some systems appear more than once, for different RAID levels tested. To determine rankings, Macworld Lab indexed the combined test results against the fastest system in each test. Thus, the MegaDrive MR/5 RAID tested at Level 0 gets a 1.00, and the CoreArray 20000 tested at Level 5 gets a 0.47. Index numbers are listed to the left of system names. Remember, in most cases Level 0 systems should perform faster than systems using higher RAID levels. Several individual hard-drive mechanisms have been added for comparison.

Times are in seconds. Shorter bars are better.



BEHIND OUR TESTS

full spectrum of RAID performance. To test speed in a database environment, we found an unindexed value in a 96,775-record 4th Dimension database. For figures on large-file performance, we opened and saved a 40MB Photoshop 3.0 TIFF file, with the scratch disk set to the

> Macworld Lab also conducted larger-file duplicate tests; extensive tests of sustained throughput (transferring data in 20MB, 40MB, 80MB, and 160MB chunks to look for symmetry in performance); and low-level tests including read, write, and seek. We do not present the voluminous results of those tests, but they were entirely consistent with the overall performance figures shown above. We also ran spot tests with the Radius VideoVision Studio card for compatibility and video-capture performance. For video capture, we found that almost any RAID

RAID. We also duplicated a 40MB file in the Finder.

Macworld Lab used a wide range of tests to show the Level 0 system using a single NuBus SCSI-2 adapter card can perform acceptably well if properly tuned.

We ran all tests on a Power Macintosh 8100/80 with 250MB internal hard drive, 24MB of RAM, and a standard monitor. We ran System 7.5, with the display at 8bit and AppleTalk turned off. We partitioned the drives in each system to give a total array volume of 2GB. In some cases this was the total capacity of the system, while in others it was just a fraction of the total

We ran hot-swap tests on three systems: the Mirror Precision 6, MegaDrive MR/5, and CoreArray 20000. In each case we caused the failure of one of the drives in the array, then added a new drive and rebuilt the array. All three systems passed the test, although they suffered significant performance degradation during rebuild.

Macworld Lab testing supervised by Tim Warner

ly in a desktop video environment, is less because QuickTime imposes a significant bottleneck on data throughput. Aside from QuickTime, there are other bottlenecks to performance, but these should be eliminated in the next year or so.

- Network Speed You can improve Ethernet speed by using switching hubs or fast Ethernet, both available now. In general, though, don't expect to get optimum performance from a Level 0 RAID system over a network.
  - NuBus Speeds Power Macs using

the PCI bus will ship later this year and should offer more than double the current NuBus speed.

- Processor Overhead Power Macs based on the PowerPC 604 are also expected this year.
- File-System Speed The next version of the Macintosh OS, code-named Copland, is expected to ship late this year or early next year. Changes to the Mac OS should improve drive performance.
- SCSI Transfer Speeds High-performance interfaces—such as Firewire,

Ultra-SCSI, SSA, and Fibre Channelmay be available later this year, and all will offer better performance than the current SCSI-2 Fast/Wide standard.

#### Beyond Speed

As you build your RAID system, consider physical design as another ease-of-use factor. The systems from Spin, Microtech, APS, MaxConcept, and Optima use standard stand-alone drives. All of the other systems package two or more drives in a single box, with the exception of the

#### **Vital Statistics on Tested RAID Systems**

Vendor*	Product	Phone	Toll-Free Phone	RAID Levels Supported**	Formatted Capacity	List Price	Cost per GB
APS	Arraid	816/483-6100	800/233-7550	0, 1	4.1GB	\$2899	\$707
Bottom Line	Magic 4GB	512/892-4070	800/990-5793	0, 1	4GB	\$5710	\$1428
Core International	CoreArray 20000	407/997-6055	800/920-2673	3, 5	10GB	\$19,996	\$2000
Direct Connections	DC3400W	612/937-6179	800/572-4305	0, 1, 4, 5	3.4GB	\$4755	\$1399
FWB	SledgeHammer2000FMF	415/474-8055	none	0, 1	4.1GB	\$2359	\$575
	SledgeHammer4100FMF-W			0, 1	4.1GB	\$5999	\$1463
La Cie	Joule RAID	503/520-9000	800/999-0143	0, 1, 4, 5	4.2GB	\$2999	\$714
MaxConcept	SW-4100R	619/530-9062	none	0, 1, 4	4.1GB	\$6085	\$1484
MegaDrive Systems	MR/5 RAID	310/247-0006	800/664-6242	0, 3, 5	8GB	\$18,840	\$2355
Microtech International	XLerator RAID Empire	203/468-6223	800/626-4276	0, 1	2GB	\$3780	\$1890
	XLerator RAID P1700FW	Tanta I		0, 1	3.4GB	\$6664	\$1960
Mirror	Mirror Precision 4	612/830-1549	800/643-3374	0, 1, 4, 5	4.08GB	\$5699	\$1397
	Mirror Precision 6			0, 1, 4, 5	6.12GB	\$8999	\$1470
Optima Technology	DisKovery 3600DHW	714/476-0515	none	0, 1, 5	3.4GB	\$5580	\$1641
	DisKovery 8200W			0, 1, 5	8.2GB	\$7790	\$950
Radius	Studio Array	408/541-6100	800/572-3487	0, 1	4.1GB	\$6999	\$1707
Spin Peripherals	RAIDline1	617/630-1200	800/215-9200	0, 1	2GB	\$1398	\$699

Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's panies, not individual products, and we call only those companies whose products Macworld Lab tests. \*Other RAID vendors include Ciprico (612/551-4000), Conner Peripherals (408/618/709-3300), Procom Technology (714/852-1000, ext. 414), Raidtec (408/541-6100), Transoft (805/565-5200). \*Most vendors offer a range of products that support a range of RAID

La Cie Joule system we tested, which accommodates several drives in a modular, stackable system with a single power supply at the base. If desk space is an issue, consider one of the single-box systems or the La Cie Joule first.

The systems from Microtech have some irritating design characteristics—the logo on the front of the case is the power switch, the SCSI-address switch is on the bottom of the case, and the stands provided for keeping the cases vertical fell off every time we lifted a drive. Ironically, Microtech mysteriously shipped us extra boards and cables that we couldn't use but didn't include RAID documentation with one of the systems. We also noted on the system from Bottom Line that the drive-activity LEDs in the case were not actually connected to the drives.

In addition to the Photoshop problems with the Microtech systems, Macworld Lab noted some random system crashes during tests with systems from FWB, Mirror, and Optima. We also had serious problems with the MegaDrive system; we eventually traced the problems to a defective controller card, but this took us several days to correct. We were glad we spent the time, as the MegaDrive system ended up as the top performer.

The three hot-swap systems, from MegaDrive, Core, and Mirror, were subjected to real-time drive-failure tests. We caused a drive to fail by pulling it from the array while the system was powered

up and in use. We then tested the array's ability to reconstruct the failed drive by inserting a new drive. (We didn't need to insert a new drive for the Core system, which comes with a hot spare, an extra drive that automatically kicks in to rebuild the array.) All three systems passed this test. We should note that the performance of the arrays during rebuild

power supplies and fans are arranged such that any one component can fail and the entire system will still function. These systems also provide notification of a failed fan or power supply.

#### **Buying Strategy**

After you determine what you need for total storage, performance, and data re-

#### DON'T SPEND MORE THAN NECESSARY TO

#### MEET THE RELATIVELY MODEST REQUIRE-

#### MENTS OF DESKTOP VIDEO

was significantly slower than normal.

The Mirror Precision 6 has one dedicated power supply per drive, with all power supplies providing power to two fans. Should one power supply fail, you would also lose the use of the drive it was supplying. There is no notification of a fan failure, and we found that although in theory you can remove a failed fan while the system is powered up, we were unable to reach the power-cord connector on the higher fan without removing the lower fan as well. Even a temporary loss of both fans might overheat the system.

We much preferred the MegaDrive and Core designs. Their dual redundant

dundancy, remind yourself why you are considering a RAID system. If you're looking strictly for performance, a RAID Level 0 array is your best bet. But don't overbuy. While you may never be able to get too much speed for prepress work, don't spend more than necessary to meet the relatively modest throughput requirements of desktop video.

If your primary need is for data protection, get a system that supports data redundancy. If preventing system downtime is critical (such as for a medicalrecords or accounting system), make sure the system also supports hot swapping and has redundant components. This can

SCSI-2 Card Included	Drive Type	Background Rebuild	Warranty (in months)	Tech-Support Rating
no	Fast	yes	60	not rated***
yes (2 cards)	Fast/Wide	yes	60	poor
no	Fast	yes	60	excellent
yes	Fast/Wide, dual-head drive	yes	60	poor
no (uses dual SCSI bus in 950/8100)	Fast	no	48	acceptable
yes	Fast/Wide	по	48	acceptable
no	Fast	yes	60	acceptable
no	Fast	yes	24	very good
yes	Fast/Wide	yes	24	very good
yes	Fast	no	60	acceptable
yes	Fast/Wide	no	60	acceptable
yes	Fast/Wide	yes	24	very good
yes	Fast/Wide	yes	24	very good
yes (2 cards)	Fast/Wide, dual-head drive	yes	12	not rated
yes (2 cards)	Fast/Wide	yes	12	not rated***
yes	Fast/Wide	no	12	very good
no	standard	yes	60	not rated

support technicians. Macworld uses a point system, including bonuses and demerits, to derive the final rating. Ratings are for com-456-4500), Dynatek Automation Systems (416/636-3000), Micronet Technology (714/453-6100), Micropolis Corporation levels; call for specific offerings. \*\*\*Company requires product serial number for tech support.

be expensive, but consider what it would cost to re-create the accounts of scores of clients, or what havoc a lost file can impose on a press schedule.

The easiest way to compare prices is to look at the cost-per-gigabyte column in the product table. These figures point up some interesting disparities. The FWB SledgeHammer4100FMF-W and the Radius Studio Array performed similarly and use identical drives and SCSI cards, yet the Studio Array costs almost \$250 more per gigabyte. One wonders if Radius's superior documentation and specialized video support are worth the difference.

Cost and performance may not always be overriding considerations, however. Also look at ease of use, vendor reliability, the quality of documentation, and technical support. Remember, you will probably need help with these complex systems. Core International was the only RAID-system company that performed well enough on our tech-support testing to gain an excellent rating (aside from software vendor Trillium Research), though MaxConcept, MegaDrive, Mirror, and Radius all provided very good technical support. Bottom Line and Direct Connections were unable to answer any of our questions correctlyhardly reassuring, particularly if this purchase will be your first RAID system.

Documentation was similarly uneven. While the Radius manual was clear and helpful, one of the Microtech systems came without any manual whatever, and Optima didn't bother to send a manual for its RAID software—although after our tests were complete we got a draft copy of the Optima documentation. The MaxConcept manual had no illustrations even though setup requires opening your Mac and installing cabling.

#### The Last Word

The products we tested represent a good cross section of the current crop of Macintosh RAID—a market dominated by Level 0 systems. Compare the various systems with the reference tests we ran on stand-alone drives. You may find that for applications—such as searching a massive database—you'll be better off just buying the right drive and a SCSI card.

If you've got more time than money, consider building your own RAID system. Trillium's Remus RAID software is available as a separate product, and you can shop for the best price on drives from any vendor. If you're planning on using your RAID for desktop video, however, we don't recommend this approach. There are more than 60 different configuration parameters on modern hard drives, and setting up a given pair of drives optimally for desktop video requires specialized knowledge. Our spot tests showed that the correct settings can make the difference between dropped frames and a perfect capture. Stick with a vendor (such as Radius, FWB, MaxConcept, and Direct Connections, among those whose systems we tested) that understands how to prepare a RAID for desktop video. (Radius designed its Studio Array specifically for desktop video users.)

For top performance in a RAID Level 0 system, the Optima 8200W or 3600-DHW get the nod, though for most users the speed advantage over the FWB SledgeHammer2000FMF would not justify the Optima systems' far higher cost.

If you need both data redundancy and minimum downtime you need a hardware array with hot-swap features. The Mirror Precision 6 is a relatively low-cost system with the basic features, but it's lacking in both performance and adequate hardware redundancy. The CoreArray 20000 has all the features you might need, but its performance was sorely disappointing—though adding a SCSI-2 card would greatly improve that record. The expensive MegaDrive MR/5 is an obvious choice for RAID Levels 3 and 5—with top performance on Level 0 as a bonus.

MATTHEW LEEDS is the technical-services manager for a major software developer. His responsibilities include network management, WAN technology, and digital-video production.

#### RAID SYSTEMS



Among a cross section of available RAID systems, we selected

two for their balance of speed, effective design, customer support, and overall value.

#### RAID 3 or 5

MR/5 RAID This unit offers excellent performance and very good technical support, along with the protection of true data redundancy—if you can afford it. Company: MegaDrive Systems. List price: \$18,840.

#### RAID 0

SledgeHammer2000FMF A surprising bargain with reasonable speed from a reliable premium-drive vendor. Company: FWB. List price: \$2359.

## No matter how fast can't outrun a power

#### New Back-UPS: reliable power for your Mac

Just don't have the time for power problems on your Mac? Don't worry. They'll always make the time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes. You can't run, but you can hide, behind APC protection.

#### IN THE NEXT THREE MONTHS, MORE THAN 30,000,000 PCs WILL BE HIT BY POWER PROBLEMS...

Who needs power protection? If you use a computer, you do. A study in a recent *PCWeek* showed that the largest single cause of data loss is bad power, accounting for almost as much data loss as all other causes combined. Every Mac plugged into an outlet is vulnerable. In fact, you have better odds of winning the lottery than of escaping the sting of power problems. One study found a typical computer is hit 100 times a month, causing keyboard lockups, drive damage, or worse.

Simply put, if power problems are the least of your troubles, you've got one chance to keep it that way. You insure your car and home with the best policy you can afford. It just doesn't make sense to



Source: Contingency Planning



Source: Bell Laboratories

Power problems are the leading cause of computer data loss, while the most frequent type of power problems are undervoltages and blackonts, which surge suppressors alone are powerless to protect against.

leave your Mac (which is at far greater risk) vulnerable to loss or damage.

#### WHY A \$119 APC UPS COSTS LESS THAN A \$9.99 "SURGE PROTECTOR"...

Contrary to most people's belief, a Mac alone has more protection built into it than a low-end "surge suppressor," which is usually nothing more than a well-packaged extension cord. In other words, going without protection is as good as

under-spending on one of the most important computer decisions you'll make.

And since sags and blackouts represent more than 90% of power problems likely to hit For extended brownout protection for advanced Mac workstations call about APC's New Back-UPS Pro!

your Mac, even quality, high-performance surge suppressors are literally powerless to protect your Mac from data loss.

That's why you need instantaneous battery backup power from an APC Uninterruptible Power Supply to prevent keyboard lockups, data loss, and crashes. With an APC UPS, you get six

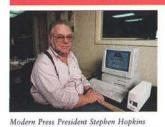
times the protection of a highend surge protector for little more than twice the price. And \$119 is much less expensive than false piece of mind.

APC UPSs carry up to a \$25,000 lifetime guarantee against surge damage to your properly connected equipment,



and can suit any application, from servers and PCs, to fax and satellite systems.

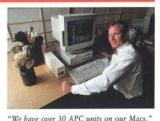
#### More than 3,000,000 satisfied customers count on APC reliability



explains, "I protect my Mac Performa with a Back-UPS 400 and the unit works great. The Mac handles all bookkeeping, administrative and estimating functions for the company. It is a critical piece of my business. Unfortunately, we are located in an industrial park... a nice way of saying that our power fluctuates a great deal. After five years of reliable performance from my Back-UPS, power problems are no longer my concern. I can focus my energy on my business instead."



At Cellophane Square, Seattle's best known independent and alternative rock record store, Steve Marcus, Product Buyer, counts on APC to keep his Mac II SI and POS terminals running reliably. "The building where we started out was ancient and full of power problems. I lost lots of purchasing and product related information... until we invested in APC. I chose APC because they offer the most reliable product. I haven't been proven wrong yet, Problems continued in the building, but they were no longer a problem for us."



we have over 30 APC units on our makes, says Tim Girvin, principal of Tim Girvin, period of Tim Girvin, Design, Seattle, WA. "Why do we protect every computer in the firm with an APC? As design consultants working on projects throughout the United States and Asia, 100% productivity is critical to project management. We cannot afford lost files due to power outages because of the complexity of many of the design programs we manage. Lost projects due to unprotected files is simply irresponsible. With APC in place, power problems are not even an issue, we are protected."

your Mac is, it problem

starting at \$119

#### PROTECT YOURSELF OR KICK YOURSELF...

It's been said that there are two types of computer users: those who have lost data, and those who are about to. Prevent the single largest cause of computer problems and join a fast-growing third category: those who protect their PCs with the most reliable protection they can buy: APC UPSs. So ask for APC at your favorite reseller. At just \$119, an APC UPS is serious protection no Mac user should be without.

MacWEEK "Ultimately, it's more a question of when and not if - you should buy a UPS... UPS power protection has never been cheaper or more convenient"

MacUser "If you have a server and don't have a UPS, you're playing with fire."



#### Back-UPS FEATURES

- Unmatched surge/lightning protection for maximum hardware safety
- Site diagnostics automatically spot missing ground and reversed polarity
- LAN signaling allows simple shutdown with interface kits (400 and above)
- User replaceable, hot swappable batteries insure uptime safe disposal
- \$25,000 lifetime Equipment Protection
- 10 minute runtime with specified applications. For longer runtimes choose next largest unit.

Model	Application	Sugg. List
200	Desktop systems	\$119
280	Desktop systems	\$139
400	MultiMedia	\$199
450	Quadra	\$254
600	PowerMacs	\$359
900	Longer runtime	\$529
1250	applications Multiple systems	\$689



"★★★★...should be standard on every desktop... effective, affordable, designed to last..." --PC Computing









APC products have won more awards for reliability than all other UPS vendors combined



AMERICAN POWER CONVERSION

Call 800-800-4APC

Dept. D7

132 Fairgrounds Rd. W. Kingston, RI 02893

Tel: (401)789-5735

Fax: (401)789-3710

Compuserve: GO APCSUPPORT

Internet: apctech@apcc.com

## Paper

CHASE

#### ACROBAT, ENVOY, AND OTHER NEW-GENERATION PORTABLE-DOCUMENT

You can forgive the 1.0 version of any product for having rough spots, especially when the first-generation software is designed to solve a new type of problem or an old problem in a new way. Such was the case with portable-document software, which in 1993 caused a great deal of buzz. This one technology, developers claimed, would tackle so many problems—too many paper documents needlessly killing trees, piling up unused in warehouses or filing cabinets, and causing frustration among businesspeople unable to find the document they needed in the sea of papers around them.

While you can easily move documents around by E-mail, server, or disk, you can't assume that everybody has the right fonts on their systems, or that they have the right program to open your document, or even (in a cross-platform environment) the right setup to receive the document. You could spend a lot of time and money installing the same software and fonts, plus the requisite extra harddisk space and RAM, on every system to allow document portability—and then train people on each program used to create the documents in the first place. But of course you don't, and neither do most other people.

This problem was obvious, and soon several companies offered a software

solution: portable-document programs. First came No Hands Software's Common Ground (415/805-5800). Adobe Systems later shipped Acrobat (408/961-4400), which legitimized the field. Farallon Computing followed quickly with Replica (510/814-5000).

By creating electronic documents that carry all the needed components—fonts, graphics, and even a program (called a viewer or reader) to view and print the document—this type of software could eliminate the cost and time of printing, distributing, and storing paper copies, while adding the ability to find text and link multiple documents so information would be both more accessible and more dynamic.

Although known in industry parlance as portable-document software, what distinguishes the technology is not its portability—E-mail and networks make a document portable, after all—but its autonomy. Portable documents are self-reliant entities that remain intact no matter what their environment.

Whether for use within a company for document exchange and distribution, or for use on bulletin-board systems, CD-ROMs, and fax-back services for user-requested documents, the possibilities for portable-document software were beguiling. PROGRAMS OFFER

TO REPLACE

PAPER DOCUMENTS.

DO THEY

**DELIVER?** 

by Galen Gruman





But the first generation didn't live up to its promise. The initial programs had gaping holes, not just rough spots, in the capabilities they offered. For example, Acrobat had no distributable reader, thus imposing an unrealistic cost for those wanting to distribute documents widely. Replica had great difficulty with fonts and graphics, resulting in documents that bore poor resemblance to the original.

However, several companies are trying to fix that by offering a second generation of portable-document tools: Acrobat 2.0 tries to go the next step, and No Hands Software promises to follow suit with the forthcoming Common Ground 2.0. In addition, two new players enter the fray: Novell's WordPerfect Envoy 1.0 (801/429-7000) and Apple's portable digital document (PDD) feature in System 7.5 (408/996-1010). Do they fulfill the portable-document promise?

#### Three Classes of Use

One reason that portable-document software is uneven is that it is aimed at three types of users, whose needs differ.

- Collaboration Workgroups need tools that let them work in concert on documents, so they can trade comments and incorporate elements of shared documents into their own. High fidelity, small file sizes, annotation tools, and search capabilities are important. A free viewer is less important, but an affordable annotation-and-search tool is a must.
- Repository Corporate communications and information-services departments want a tool that lets them put common documents into a repository that anyone can access-not just to view but also to search. Here, capturing text that can then be highlighted, copied, and searched by recipients is key, as is generating small files so the network doesn't get bogged down. Fidelity and free viewers are less important but desirable.

Certainly, inexpensive viewers are a must.

■ Distribution Electronic publishers need a tool to create computer-based versions of their documents for read-only use. It's the electronic equivalent of a fax, useful for the distribution of newsletters, price lists, and forms, for example. Here, high fidelity and small files are key, as well as a free viewer program.

With these distinct markets in mind, Macworld Lab put Apple's PDD feature and the four portable-document programs (Acrobat, Common Ground, Envoy, and Replica) through their paces to see if they live up to their primary mission: producing accurate renditions of exchanged documents.

The results from the Macworld Lab tests were surprising-even the secondgeneration programs have problems with some fonts and the standard page-layout programs. Only Adobe's Acrobat 2.0 comes close to what's needed on the broadest scale. It handles electronic distribution, content search, and document management. Novell's WordPerfect Envoy is similar to Acrobat, except that font fidelity is not a given unless everybody uses the same fonts in their systems. Envoy also does a poor job of reproducing images from QuarkXPress and Page-Maker files, and it doesn't offer the crossdocument searching feature that Acrobat 2.0 has. Both programs are best suited for collaboration and repository usage.

(PageMaker and QuarkXPress are key tests for portable-document tools, since both programs use their own printing engines, rather than the Mac's Quick-Draw or Windows' GDI. That often trips up portable-document software.)

For people who mostly need to distribute documents electronically, Common Ground 1.1.2 is a fine choice. The program retains decent constancy of text and graphics, offers protection of these elements so you can distribute information without fear that the material might be used in other documents, and Common Ground's embedded viewer is a manageable size. Replica offers similar capabilities, although it performs poorly in maintaining the original appearance of graphics from the two key publishing programs: PageMaker and QuarkXPress.

Apple's portable digital documents have almost no value. All you get is a static, bitmapped version of your document that you can view and print. You can't search, you can't highlight, you can't annotate, you can't skip among pages, you can't work across platforms, and you can't rearrange the layout to suit your needs. Plus you need to run the QuickDraw GX component of System 7.5, something that consumes a lot of memory and has difficulty with several print, fax, and portable-document drivers.

#### Collaboration and Repository: Use Acrobat or Envoy

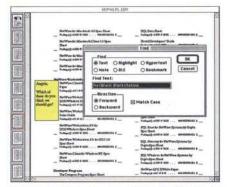
Both Acrobat and Envoy are decent choices for creating shared documents for lookup (such as corporate phone directories) and markup (such as draft memos circulated for comments). The differences between the two programs come down to issues of complexity.

Program Options For Acrobat, the complexity begins when you go to buy it: it comes in several configurations. There's the \$195 Acrobat Exchange, which lets you create, annotate, and view documents; but for others to share the wealth of your information, they must each shell out the full price of the program. The \$595 Acrobat Pro includes Exchange and Distiller. Distiller converts PostScript print files into portable documents, which is useful if you have a repository of PostScript files or if you use Unix or PC software (such as for CAD and documentation publishing) that has no Mac equivalent. The best buy of the bunch is the \$1595 Acrobat for Workgroups version, which has ten licenses for Exchange, one for Distiller, and one for Catalog, a Windows-only indexing tool that creates indexes to let you search across multiple documents (normally you can search only within a document). Acrobat for Workgroups includes both Mac and Windows software for Exchange and Distiller so you can use it for both Mac-only and cross-platform networks.

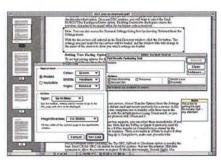
Like its competitors, but unlike Acrobat 1.0, all of the Acrobat 2.0 packages include the Mac and Windows versions of Reader, a program you can freely distribute so recipients can read, search, and print Acrobat documents.

Acrobat requires the use of Adobe Type Manager, a font-fidelity engine, in version 3.6 or later; version 3.8.1 is bundled in the Exchange, Pro, and Workgroups packages. Acrobat's Reader won't run unless you have a full version of ATM 3.6 or later installed.

Envoy is simpler: the \$195 program comes in one package, and the software comes on just one disk. Envoy lets you do essentially what Acrobat Exchange does, and Envoy's Reader is similar to Acrobat's Reader, except that you can embed Envoy's Reader in your document (adding about 360K), rather than distributing a 1.2MB file that the recipient must install,



Information Envoy Novell WordPerfect Envoy 1.0 gives you thumbnail views, hypertext links, comprehensive search capabilities, and a highlighting tool to simplify the perusal of information in a document. Unfortunately, font fidelity is often poor. Fortunately, system requirements are light.



Page Acrobat Adobe Acrobat 2.0 offers page thumbnails, hypertext links, and a sophisticated search engine, all of which make document navigation fairly simple. The price for these features is higher resource requirements than other programs.

as you must with Acrobat. Envoy also has a stand-alone viewer, available in Mac (650K) and Windows (200K) versions, which is helpful in instances where you don't know what platform your recipient uses. The stand-alone viewer is also preferable in a cross-platform network: Windows users can't launch an Envoy document that contains an embedded Mac viewer; they need the stand-alone Windows viewer, which will ignore the embedded Mac viewer. Macintosh users face the same problem with documents using an embedded Windows viewer. Envoy does not require the use of ATM, but you'll want ATM 3.6 or later anyhow because of Envoy's poor font fidelity.

Font Fidelity Envoy can neither embed fonts nor emulate their appearance. Instead, the program substitutes the closest font it can find, and my experience is that this process misses more often than it hits, particularly for PostScript fonts. Another serious drawback to Envoy is the poor reproduction it offers of bitmapped images in PageMaker and QuarkXPress documents (see the samples in "A Question of Fidelity").

Acrobat is better at font fidelity, but it is hardly perfect. Acrobat occasionally converts fonts it doesn't know how to handle—typically symbols and nonroman fonts but sometimes fonts created by programs like Macromedia Fontographer and Ares Software FontMonger—into bitmaps, so you can't search any text using them. To get around this you can embed the problem fonts in your document (via Page Setup) before printing to Acrobat format, or you can print to a PostScript file with fonts included and use Distiller to generate the Acrobat document.

**Document Markup** For annotation and markup, it's a draw between Acrobat and Envoy.

No matter which you use, keep in mind that you'll need to produce your documents with portable-document use in mind. Unlike documentation software, such as Frame Technology's FrameMaker (\$895, 408/975-6000), portable-document programs are not complete authoring tools, despite some similar features.

For example, both Acrobat and Envoy let you insert bookmarks, view thumbnails of your document's pages (which you can rearrange) so you can quickly decide where you want to go, and add sticky notes (with customizable colors and names, so in a multiuser setting, you can tell who wrote what).

In addition, both programs can create hypertext links between sections of your document, only they don't change the hypertext color as FrameMaker does—you need to color that text in your



#### A Question of Fidelity

It's hard to overstate the need for faithful reproduction of portable documents. After all, if you needed to share just the text, you'd send a text-only version of the document.

To gauge fidelity, Macworld Lab created several documents using a variety of fonts and image types. The images here show

where the portable-document programs had problems. If you're using PICT images, uncomplicated EPS images, and basic TrueType and PostScript fonts, any of the portable-document programs can render a decent version of the original-except for Envoy when the original file is created in QuarkXPress or PageMaker.

	Original	Acrobat Exchange 2.0	Replica 1.04	Common Ground 1.1.2*	Envoy 1.0
CMYK TIFF					
Complex EPS				2	- 11
	To the state of th		1		T
PICT		S		SI	
	The state of the s	- Something V	The state of the s		
Fonts	Remedy	Roemedy	R emedy	Remedy	R emedy
Fonts (default settings)	Roemedy Poppl- Laudatio	Roemedy Poppl- Laudatio	R emedy Poppl- Laudatio	Remedy Poppl- Laudatio	R emedy Poppl- Laudatio
To 20 10 10 10 10 10 10 10 10 10 10 10 10 10	~	~	Poppil-	~	Poppl-
To 20 10 10 10 10 10 10 10 10 10 10 10 10 10	Poppl- Laudatio	Poppl- Laudatio	Poppl– Laudatio	Poppl- Laudatio	PoppI- Laudatio
To 20 10 10 10 10 10 10 10 10 10 10 10 10 10	Poppl- Laudatio Garamond Condensed	Poppl- Laudatio Garamond Condensed	Poppl- Laudatio Geramond Condensed	Poppl- Laudatio Garamond Condensed	Poppl- Laudatio Garamond Condensed
To 20 10 10 10 10 10 10 10 10 10 10 10 10 10	Poppl- Laudatio Garamond Condensed DELPHIAN	Poppl- Laudatio Garamond Condensed DELPHIAN	Poppl– Laudatio Garamond Condensed Delphian Latin	Poppl- Laudatio Garamond Condensed DELPHIAN Latin	Poppl- Laudatio Garamond Condensed Delphian Latin

originating word processor or page-layout program. But both programs put a color frame (your choice of color) around the hypertext.

However, the two programs set up links differently. Envoy has a palette of nine hypertext jump icons you can insert (including arrows, a target, and a frog); in Acrobat, you have to add any such graphics in the originating program. But Acrobat lets you control the view the user gets of the destination page when he or she double-clicks on a hypertext link, and Acrobat lets you link across documents, not just within them. Envoy's advantage is that creating links is more intuitive.

Envoy's links falter after you insert

or delete pages—the program is not smart enough to adjust the link destinations after repagination. Still, given Envoy's simpler resource requirements, you should go for it over Acrobat if your primary need is markup.

Repository Documents If your goal is to centralize documentation-everything from phone lists to operations manuals, from product lists to press releasesand make it accessible to your whole company, Acrobat is your answer, but only if you use a cross-platform network. This is because Acrobat's Catalog program runs only on Windows 3.1 servers, and it is incompatible with Farallon's PhoneNet PC software, so you can't use

Catalog to index Mac files on a cross-platform AppleTalk network. (TCP/IP and NetWare networks should work fine.) A workaround is to transfer your Mac Acrobat files to a Windows PC, create the indexes in Windows, and move the files and their indexes back to your Mac network. This approach also works if you create CD-ROMs.

The Catalog program in Acrobat for Workgroups generates search indexes that let users look for text in any collection of documents in a particular folder and its subfolders, which makes it easy to find all related documents. Acrobat uses the Verity Topic search engine, a tool that does sounds-like and grammaticalvariation searches. The Verity engine also estimates how good a match each document is to your search parameters.

Note that the Verity search tool comes with Exchange but not Reader. Thus, if you try to save money by buying Exchange for just document creators and using the free Readers for everyone else, Reader users won't be able to use the Verity search features (including the cross-document search), and your investment in Catalog will be for nought.

Realize also that you can't count on Acrobat to create documents shared outside your corporate environment, such as for online documentation to be distributed by BBS, floppy disk, or CD, since you can't guarantee that those people will have the right version of ATM installed.

All in all, Acrobat is a better program than Envoy for creating companywide searchable files, but there's still room for improvement, particularly because there is no good solution for creating repositories that are searchable by customers, subscribers, and others whose systems you don't manage. Perhaps that solution will come in the form of plug-in modules, similar to the XTensions in QuarkXPress and the plug-ins in Adobe Photoshop that add functionality to a program, since one of the major enhancements to Acrobat has been support for plug-in technology. In fact, the Verity Topic search feature in Acrobat is one such plug-in that Adobe bundles with the product.

While Adobe expects many plug-ins to be developed for niche markets, one broadly useful plug-in it is developing is an OCR feature that would let you scan documents, do character recognition, and then create an Acrobat document based on the recognized text. Another technology that could help Acrobat in the corporate sphere is its support of AppleScript, which lets you automate repetitive tasks.

#### Distribution: Use Common Ground or Replica

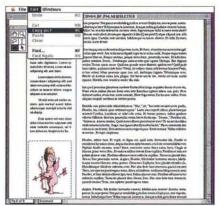
If your goal is one-way distribution to a wide range of people, you can't necessarily count on Acrobat or Envoy to handle your distribution needs. To use Acrobat, everyone must have ATM installed; to use Envoy, everyone should have the same fonts. For distribution, you want software designed to produce files that are faithful to the original, that anyone can read or print, and that recipients can optionally search and copy content from. That leaves Common Ground and Replica.

**Program Options** The \$189.95 Common Ground 1.1.2 has been around longer than any of the competition, and it still offers the best set of features for the distribution market. That's because it

works, easily and simply. The \$195 Replica offers features similar to Common Ground's but doesn't work as smoothly.

Common Ground 2.0, which was still in early development at press time and unavailable for preview in either Windows or Mac versions, is supposed to use a new font-fidelity engine (Bitstream's TrueDoc) and to add many of the collaboration and repository features that Acrobat and Envoy offer, while retaining its small embedded viewer and distribution strengths. Originally scheduled to ship by the end of 1994, look for Common Ground 2.0 sometime by spring.

Ground 1.1.2 offers just what's needed for the distribution market: control over what others do with your document. You can prevent recipients from printing files, copying text, or copying graphics—or any combination of the three. That's important for publishers, who often want users to be able to excerpt the text but not the images (because of different copyright agreements reached with authors and artists). Replica offers only the option of



**Simple Common Ground** No Hands Software's Common Ground 1.1.2 lets you easily exchange files with users both off and on your network. It doesn't offer document-navigation capabilities, but does let you copy out text and pictures.

	EXPER	SE	REPORT	Charles .	Digateth !		-		Expense
20	Date	18	Otymes State	Interes			Acres .	Tells	Bestfet
1	0(1)	1	Ree You, Mr		90.00	111.00	28.00	10006	81.00
1.0	_								
1.5   2	00.24		London Bry	22000	30.00	119.00	1200	9538	109.00
2.7   2   100	Die 25	1	London, the	TORK.	10.00	119.00	41.00	1000	9600
1.04	9+26	:	Some bay	MORE	67.00	34.90	19.00	3800	13.000
10   10   10   10   10   10   10   10	De-27	÷	Stone Bay	MERC	6710	8600	The same	THE	11600
10   10   10   10   10   10   10   10	54.14	:	See Mr.	MORE	4200	3000	79.00	7900	17606
1027A10 20000 10000 77300 12300 58000 7600  Exercise Entert Associated and Associated As	Dec. 19		ten ben	-	4500	-	944	7844	19400
to Nome intertwined Nature, Company, Title Stree and Name - Nature and Name of Single-d - 1250' coon last Page - 28th lands not	and the	-		15050					790.00
18 Queer of England (15% room but Place (2th hards out.				Batterel	Inferience	est and the	man Av	6	-
	Osta			www. Total					ite
	-	П	ACCORPTION		-	The second	-		

**Approximate Replica** Farallon Computing's Replica 1.04 provides straightforward document exchange for viewing and printing, but font fidelity is uneven. However, the program does preserve formatting in text copied from its files.

restricting the recipient to viewing.

Both Replica and Common Ground offer basic text-search capabilities (by word, for example) that are sufficient for distribution of individual documents.

You can embed a Common Ground viewer, which lets anyone view or print a Common Ground document, in your document. Best of all, and unique to Common Ground, you can choose whether to embed a Mac or Windows viewer, so you can do your authoring on the Mac and distribute fully self-contained portable documents to people on both platforms. And since it's the smallest embedded-viewer size around-iust 90K for the Mac and 100K for Windows-you can afford to routinely embed the Common Ground viewer. Of course, you can also distribute the Mac and Windows viewers separately, and not embed them in your Common Ground documents. This last scenario is best for BBS operators or online services who don't want to boost the file size for each document unnecessarily.

If you want your recipients to search for text in your files or copy out text or graphics, they'll need the full version of Common Ground installed. The embedded and stand-alone viewers just let them print and display documents. Replica also embeds a viewer, which amounts to sending along the full Replica program—at a cost of about 400K. Both programs let users select text in columns, although Replica's method is simpler.

Electronic Publishing To ease distribution, Common Ground lets you send files via E-mail from within the program, but only if you use System 7's PowerTalk E-mail feature (included with System 7 Pro and 7.5, optional in System 7.0 and 7.1). Replica is not much more compatible: it supports just Microsoft Mail (which Microsoft has stopped developing for the Mac) and Farallon's own Timbuktu.

Additionally, to ease production, both programs let you drag and drop files onto creator programs, thereby launching the files' creator and generating the portable document, using default settings. I find it easier to create the portable documents from within Common Ground or Replica (both programs offer keyboard shortcuts so you can skip going to the Chooser to change the target printer), since I can then control output settings.

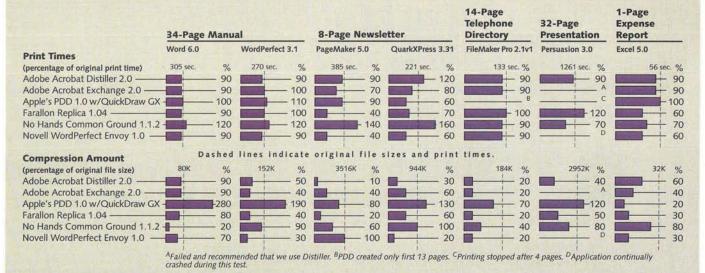
Common Ground captures the text that can be highlighted, copied, and searched when you print, and it saves a bitmap version of the file so fonts reproduce decently if the recipient doesn't have them (Common Ground uses the actual fonts if the recipient does have them). As with other portable-document programs,



#### Where Do Portable-Document Programs Excel and Fall Short?

Shorter bars are better.
Products are listed alphabetically.

Portable-document programs face basic challenges in three areas: file size, since smaller sizes make distribution easier; print times, since long print times inhibit the use of documents by their recipients; and image and font fidelity, since poor reproduction will hinder portable documents' acceptance as an alternative to paper. Macworld Lab tested all three areas (the output samples in "A Question of Fidelity" show the fidelity results).



BEHIND OUR TESTS

Because the number and type of fonts and images play a key role in determining how successfully a portable-document program creates a portable document, Macworld Lab used several real-world documents to show the range of results each program delivers. In all cases, we used the programs' default settings; options such as font embedding would add to the file size. We tested the programs on a Power Mac 7100/66 with 16MB of RAM running System 7.5. QuickDraw GX was installed only for tests of Apple's Portable Digital Document (PDD).—Macworld Lab testing supervised by Matt Clark

having the font-emulation features of ATM 3.6 augments Common Ground's native capabilities.

While Common Ground limits you to printing at 300 dpi, Replica lets you embed TrueType fonts in your document, so recipients can print text at their printer's top resolution. But Replica can't embed PostScript fonts, which limits their resolution to 300 dpi.

Both programs let you downsample your document's resolution to 72 dpi (for on-screen viewing), which saves file size. Common Ground also lets you create files using JPEG compression to further reduce image size, but as with all JPEG compression, the greater the compression amount, the less faithful the image will be.

In its testing, Macworld Lab found that Common Ground's graphics quality (with the maximum 300-dpi resolution selected) was decent, but not as good as the original. What's happening is that Common Ground is downsampling the image resolution to 300 dpi, not to the maximum printer resolution, as Acrobat and Envoy do.

Replica fared comparably well with regard to PICT and EPS files, but its quality for TIFF images was unacceptable when printing from both PageMaker and QuarkXPress. The cause was Replica's difficulty working with the print engines in PageMaker and QuarkXPress. Still, for

a portable-document vendor not to find a way to work with their quirks is foolish.

Replica can be more confusing to use than Common Ground, mostly because you can't access many of its options until after you create the portable document. This makes creation a two-step process: print to a Replica document and then open Replica to set options.

Even with its limitations, Common Ground is the better bet for document distribution than Replica. It's easier to use to create documents, and although I'd like the embedded and free viewers to offer a little more capability, the immediate cross-platform support, security options, small files, and reasonable faithfulness to original document formats make Common Ground useful for almost anyone.

#### The Last Word

Portable-document software hasn't lived up to its original promise, but maybe both developers and users have expected too much. As the major programs focus on more-defined markets, more-useful products should result. The current generation reflects more than a hint of this new focus. Go and take advantage of today's portable-document tools, but don't delude yourself into thinking that these tools mean you no longer need to standardize on word processors, layout programs, fonts, and other communications

tools. Portable-document software is not the grand unification of creation, distribution, and access software, but it is a compelling technology for certain tasks. **m** 

Executive editor GALEN GRUMAN focuses on emerging technologies.

#### PORTABLE-DOCUMENT SOFTWARE



In evaluating portable-document software, we insisted on

fidelity of images and text first, and then on features appropriate to the target markets. For collaborative and repository uses, we decided to make no recommendation. Although WordPerfect Envoy does fairly well for collaborative efforts and Adobe Acrobat, for shared-repository use, neither program is yet good enough to earn an Editors' Choice in those categories.

#### Distribution

Common Ground 1.1.2 Even with a few flaws,
Common Ground 1.1.2 is simplest to use
and offers the best options for creating
documents to be distributed to a wide,
heterogeneous set of people. Company:
No Hands Software. List price: \$189.95.



#### COMMUNICATIONS

1674	CompuServe Member/Navigator\$72.00
0080	Delrina Fax PRO for Macintosh 59.95
1246	Global PowerPort Mercury 500 359.95
7710	Global Village PowerPort Gold269.95
7446	Global Village TelePort Gold II139.95
4767	Global Village TelePort Mercury 299.95
1419	Hayes ACCURA144+FAX144124.95
8188	Hayes OPTIMA V.34+FAX144469.95
1156	Lynx Ring Director RD-20069.95
8478	MDS FaxModem 14.499.95
4879	Practical Periph MC144MTII119.95
	Practical Periph MC288MTII V.34 .229.95
7639	STF Tech. FAXstf 3.164.95
5337	Supra SupraFAXModem 144LC139.95
6619	Synergy VersaTerm Pro169.95
1842	U.S. Robotics Sportster 14.4 Fax129.95
7048	U.S. Robotics Sportster V.34 Fax274.95
16390	Ventana Press Internet Mem. Kit49.95
17470	Zoom FaxModem V.34219.95
14152	Zoom VFX 14.4V FaxMod w/Voice.149.95
H.	

15456	Adesso Extended Mac Keyboard.\$69.95
2374	CoStar LabelWriter XL+239.95
12591	GDT StyleScript99.95
15858	HP DeskWriter 560C499.95
17589	Kensington Thinking Mouse99.95
13748	UMAX UC630 Color Scanner 599.95
15345	Xerox TextBridge OCR software74.95

#### **EDUTAINMENT**

13714	Delta Tao Eric Ultimate Solitaire	\$34.95
2316	Lucas Arts Rebel Assault CD	49.95
13818	Maxis SimCity 2000	39.95
3675	Starplay Crystal Caliburn	36.95
14769	Velocity Spectre VR CD-ROM	39.95

#### NETWORKING

2775	Asanté 10BASE-T Hub\$199.95
1872	DaynaPORT Ethernet LC (internal).109.00
11499	Farallon EtherWave PN802 Trans.109.00
14545	Farallon Timbuktu Pro135.00
15490	Sonic 10BASE-T Transciever49.00

#### STORAGE

17793	FWB 700MCB Hammer PE Ext\$599.95
16820	Iomega Bernoulli 230MB Remov499.95
16852	Iomega 230MB Cartridge99.95
18148	MDS Ext. 365MB Quantum HD299.95
17960	MDS Ext. Chinon 525 2x CD-ROM.229.95

#### ACCESSORIES

5579	Adesso PowerBook Battery\$59.95
18685	BTI PowerBook Duo Battery Type 4.119.95
19330	Curtis Printer/Wrkst. Stand 49.95
1092	Kensington NoteBook Traveler Dlx75.00
15422	Sony DG90M (5 Pack)50.00
6201	Tripp Lite Isobar 859.00

#### AN EYE-POPPING CLIP-ART GALLERY!

Corel Gallery is an easy-to-use, visual clip-art manager on CD-ROM. Its packed with over 10,000 professionally-designed, high-resolution clip-art images, plus a full-color reference guide!





ALL AT LOW DISCOUNT PRICES!

#### MDS HARD DRIVES! Stretch your storage dollar

with an MDS Drive! 15950

365MB Upright **External Drive** 

▲ 200MB SyQuest Removable Drive

15951 200MB SyQuest Rem. Drive \$4 w/ 200MB cartridge......



18149

#### **WORK BETTER, FASTER, SAFER!**

Norton Utilities for Macintosh (NUM) 3.1 gives you the most advanced technology for data protection and recovery. It works automatically in the background, proactively preventing data loss before it happens.



#### **OUR POLICY** VISA, MASTERCARD, AMERICAN EXPRESS, and DISCOVER cards. No surcharge. Most of our products are covered by manufacturer's warranty. We are not responsible for typographical errors. EVERYTHING OVERNIGHT® Continental U.S.: Shipping Charges: \$3 per order: please add an additional \$10 for each desktop system, scanner, printer, monitor or power backup. Or you may elect FREE UPS Ground shipping on orders which include the hardware mentioned above. Barring UPS Ground shipping on orders which include the hardware mentioned above.

events beyond our control, all credit card orders phoned in weekdays by 3 a.m. ET will events beyond our control, an credit card draws phoned in weekdays by 3 a.m. Et will ship Airborne Express for delivery the next business day. (Some orders ship UPS Ground for next day delivery). Saturday delivery available to many areas upon request at no additional charge. Order all day Saturday thru noon Sunday for Monday delivery. Some areas require an extra day delivery.

APO/FPO, International orders and Hawaii, Alaska, Canada, Puerto Rico & U.S. Virgin Islands: Shipping may require additional time and charges. Please call for information. All other areas: Please call 603-446-3333 or FAX 603-446-7791 M-F9 a.m. 5:30 p.m. ET.

OPEN 24 HOURS A DAY! Our order lines are open 24 hours a day, 7 days a week

495MW



QUICK! What's the fastest way to get paper into your computer?

> PAPERPORT FOR YOUR MAC!!

VISIONEER

Now, in just seconds take any piece of paper and fax it, file it or copy it right on your computer!

- So fast—So easy—So powerful!
- · Works with any faxmodem or printer-turns your Mac into a full function copying machine or fax machine.
- Installation is a snap—just plug into your serial port and go.
- OCR software included!

© Copyright 1995 PC Connection, Inc. MacConnection is a division and registered trademark of PC Connection, Inc., Marlow, NH.

14187	Best!Ware Mind Your Own Busin \$79.95
16850	Best!Ware MYOB w/Payroll139.95
5863	CheckMark MultiLedger119.95
5862	CheckMark Payroll49.95
3903	ClarisWorks 3.0119.95
1668	Computer Assoc Cricket Graph 389.95
12974	DeltaPoint DeltaGraph Pro III139.95
11721	IdeaFisher for Mac95.00
11269	Inspiration134.95
15070	Jian Business Plan Builder79.95
5454	Microsoft Office for Mac 4.2479.95
8010	Niles EndNote Plus169.95
16143	Nisus Writer279.95
16884	Nisus Writer with Language Key 334.00
7447	SoftKey KeyCad Complete29.95
14790	SoftKey WriteNow 4.044.95
	Symantec ACT 2.0 Upgrade49.95
2986	Timeslips Timeslips III194.95
4711	WordPerfect 3.1 Ver. W.S.L58.95
17237	Writeplace Writing Coach59.95

#### VIDEO

17314	Magnavox 14" Color Display\$299.	95
13054	NEC MultiSync 2V Monitor329.5	95
17195	NEC MultiSync XE15569.	95
2774	Radius Precision Color 8XJ499.5	95
16943	Radius Spigot Power AV799.5	95
15796	Radius/SuperMac 17XL 17" Disp799.5	95
19162	Radius Thunder 24/GT1,399.5	95

#### GRAPHICS

1736	Adobe Illustrator 5.5\$389.95
17249	Adobe PageMaker 5.0549.95
16335	Adobe Photoshop 3.01569.95
	Corel Photo CD Collection (each)19.95
15101	Dubl-Click IconMania29.95
9034	Equilibrium deBabelizer Toolbox259.95
16746	Extensis PageTools Extensions99.95
17341	Macromedia Fontographer 4.1369.95
16962	Fractal Design Painter 3.0349.95
12983	Frame Tech FrameMaker 4.0599.95
11724	Graphsoft MiniCad+ 5.0549.95
11423	HSC Software KPT Bryce119.95
15989	HSC Kai's Power Tools/KPT Bryce.189.95
16742	MacArtist Magazine ImageFonts 39.95
5087	Macromedia Director 4.0899.95
17252	Macromedia FreeHand 5.0399.00
	QuarkXPress 3.3 599.95
4761	RayDream Designer249.95
The same of	

#### UTILITIES

7927	CE Software QuicKeys 3.01\$99.95
17537	Central Point MacTools Pro 4.094.95
14789	Connectix Ram Doubler55.00
12093	DataViz MacLink+ Translators Pro.95.00
16857	Insignia SoftWindows Mac279.00
4433	Insignia SoftWindows Power Mac 289.00
5176	Symantec Anti-Virus Mac69.95
16133	Symantec DiskDoubler Pro 1.175.95
3955	Symantec Suitcase 53.95

#### 10 CD-ROMS—ONE LOW PRICE!

It's the best multimedia value going! For less than \$60, you get 10 great Creative

Multimedia CD-ROM titles: Total Baseball,

Who Killed Sam Rupert?, Audubon Birds and Mammals,
Shakespeare, Dinosaur Safari, Sherlock Holmes,
Parenting, The Magic Death, & Beyond The Wall of Stars. 18024

#### SONY

#### **Trinitron**

**Monitors** 





Sony's Most Affordable Trinitron Monitor!

- 0.25mm aperture grille pitch
- Max refresh rate 75Hz
- Max resolution 1024x768

All Sony Monitors offer a 3 Year Warranty and are **Energy Star and** MPR II Compliant!

#### Multiscan-15sf

- · Sony's first 15" monitor!
- 0.25mm aperture grille pitch Max refresh rate 75Hz
- Max resolution 1280x1024



## MacConnect

800-800-3333

OR FAX YOUR ORDER 603-446-7791

**ORDERS** BY 3 A.M. ET SHIP FOR NEXT DAY **DELIVERY!** 



UPGRADES

#### **AFFORDABLE VIDEO!**

Take pictures and video clips for your Mac with the new QuickCam from

Connectix-for under \$100! Simply plug QuickCam into your computer modem port, install the included software, start shooting digital video or pictures. Built-in microphone!

19249 Adobe Photoshop 3.01 (Version) ('94 MacUser Winner) . \$14895

16551 Microsoft Office for Mac 4.2 

10312 Symantec Anti-Virus for Mac 4.01 (SAM) (Version) .....

16323 Symantec Norton Utilities for Mac 3.1 (NUM) (Version) . . . . .

17541 Central Point MacTools Pro 4.0 (Version) ('94 MacUser Winner) . .

17276 Macromedia FreeHand 5.0 

### Learning!

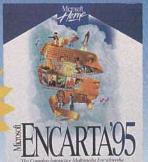
Sony Multiscan Trinitron 17sf .....



Microsoft Encarta '95 is the ultimate multimedia encyclopedia, combining words, images, animation, and sounds. Updated and enhanced for 1995, Microsoft Encarta gives you the complete text of the 29-volume Funk & Wagnalls New Encyclopedia, with more than 26,000 updated articles. It's all brought to life with full-color images, animation, maps, photos,

video clips, and sounds. It's a fun and fascinating educational resource for the whole family!





EDITED BY C

CATHY ABES

## Graphics

THE LATEST IN DESIGN, PUBLISHING, AND PREPRESS

#### Plugging into Illustrator

TWO NEW SETS OF ILLUS-

trator filters are joining the growing arsenal of thirdparty plug-ins for 5.0 and later versions of Adobe's professional-level drawing program: Infinite FX from BeInfinite and an as-yet-unnamed product developed (as Sree's Cool Tools) by Intrepid Systems and just acquired by HSC Software. Special effects offered by the HSC product include 3d Extrude, 3d Perspective, Bevel Emboss, Envelope Distort, Swirl, Fragment, Crumble, and Shatter. All but the last three (which rely on nonnative Illustrator code) are Power Mac-native. Path Blend and Radial Sweep Blend require

Illustrator 5.5. HSC is redesigning the program's interface and plans to add more

filters to the mix.

Infinite FX contains 55 filters, including Cornerize, Wiggle, Balloon, Motion Blur, Bend, Twist, and Cylinder Wrap. Others—such as Pinch, Zoom, Fisheye, and Pond Ripples-emulate effects familiar to Adobe Photoshop users. Some of the more unusual filters include Metapunk, which gives letters a furry look, and TCB (Tension, Continuity, Bias), which lets you change the tension and smoothness of a curve. In addition, Infinite FX's 3-D feature lets you rotate and add perspective to an image while applying any filter. BeInfinite reports that Infinite FX works with Macromedia FreeHand 5.0 as well; HSC could not say whether its filter set would also be FreeHand-compatible.

Infinite FX began shipping in early January; a Power Mac version came out a few weeks later. The introductory price of \$99 goes up to \$149 after April 1. HSC's product is due to ship in spring 1995; price was not set at press time but should be comparable to those of the rest of the KPT line. BeInfinite, 404/552-6624; HSC Software, 805/566-6200.—c.A.

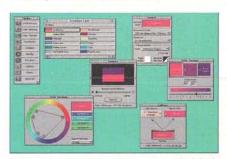


#### Precision Color Measuring

IGHT SOURCE'S COLORTRON DIGItal Color Sensor, first described in Graphic news, Macworld, June 1994, finally began shipping in December at a retail price of \$1195. Combining the functionality of a spectrophotometer, a colorimeter, a densitometer, and a monitor calibrator, Colortron also includes software for color control and manipulation.

Using spectral data, the Colortron software lets you compute new colors from existing ones, compare colors, and convert colors between color spaces and color models. You can save Colortrondefined colors in EPS-format Palette Documents, which can then be accessed

by such programs as QuarkXPress and Macromedia's FreeHand and Adobe's Illustrator and PageMaker. Colortron also includes digital-color libraries for standard color-matching systems. Light Source, 415/925-4200.—c.A.



Colortron's tools include Color Harmony, which finds color combinations that complement a chosen color, and Color Tweener, which lets you specify a shade between two input colors.

#### Drawing the Natural Way

S WO S O

TWO PROGRAMS THAT take a different approach to illustration were introduced at Macworld Expo in January. LightningDraw

GX by Lari Software and SmartSketch by FutureWave Software both feature a natural drawing environment designed for those who find existing draw programs too structured and difficult to learn.

LightningDraw GX is a Power

Mac-native draw program that fully supports QuickDraw GX, including sophisticated typographic controls and multilingual fonts. Like Smart-Sketch, it provides paint capabilities-enabling you to add brushstrokes and erase areas of an image. A reshaper tool lets you grab any point to change the shape of curves easily; multigon and star tools facilitate drawing complex shapes; while a scissors tool can remove pieces from a shape. Transformation tools let you scale, rotate, flip, skew, and add 3-D perspective. Other special effects involve merging, overlapping, cutting out, and subtracting shapes. You can customize gradient blends, set transparency levels, and convert text to shapes. Text features include automatic kerning and ligatures, and 3-D distortion and perspective. Distorted text remains in its altered form while you edit it. The program can handle unlimited layers, place EPS files, and

import and export PICT files. Created by the original developers of SuperPaint (now owned by Adobe Systems), SmartSketch is a vector-based draw program that includes paint features (such as a paint bucket), an eraser, and antialiasing. You can draw rough shapes and instantly straighten them into smooth, precise outlines. Because there are no handles or points to grab onto, you can change the shape of any line in a drawing by just dragging it in any direction. Separately drawn line segments are automatically joined to make a fillable area; the program can even be set to automatically close large gaps between lines.

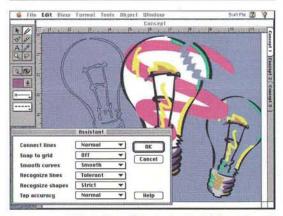
With SmartSketch you can work with multiple floating objects and paint inside or behind an object, or within selected areas. You can bring in PICT or EPS clip art and erase it; EPS files can be exported to Illustrator and FreeHand. SmartSketch supports pressure-sensitive digitizer tablets. The first version won't be Power Mac-native, but a Power Mac version is expected to ship close on the heels of 1.0.

Due in March, LightningDraw GX will sell for \$149. SmartSketch is expected to ship in the second quarter of 1995 and will retail for \$69.95. Lari Software, 919/968-0701, FutureWave Software, 619/637-6190.—C.A.

File Edit Cenwas firrange Effects Fant Size Style Window

1.06 2 4

Lightning Draw GR



LightningDraw GX's drawing tools let you dynamically add to, subtract from, or cut out parts of an object, while the reshaper tool lets you pull or push the outline of a shape (top). SmartSketch's Shape Recognition feature lets you turn rough sketches into precise drawings; you can also paint, erase, and lasso objects (bottom).

### Radius Dye-Sub for \$5000



RADIUS'S PROOFPOSITIVE 3.0 dye-sub printer offers 24-bit, continuous-tone, photo-realistic color at a competitive price of \$4999.

For the money, you get a 300-dpi, full-page, full-bleed, dye-sublimation QuickDraw printer optimized for printing color photographs; a two-page ver-

#### IN BRIEF

- 3-D Update Specular International and Strata have both announced updates to their 3-D graphics packages. Due to ship in late spring, Specular's Infini-D 3.0 (\$899; \$149 upgrade) sports some major new features, including spline-based, path-profile modeling; editable motion paths; expanded lighting controls; and the ability to animate a model's spline curves and independently edit an object's properties. Expected to be available by the end of February 1995, Strata's Vision 3d 4.0 (\$695, or \$69 upgrade) includes advanced Boolean modeling, a PostScriptbased renderer for creating images scalable to any size, and Bézierspline modeling. Specular, 413/ 253-3100; Strata, 801/628-5218.
- Photo CD to CMYK
  Purup's PhotoImpress 1.1 software
  (\$1349), currently available in
  Power Mac–native mode, lets you
  globally edit Photo CD images and
  perform batch conversions from
  Photo CD to CMYK formats.
  402/593-0789.
- Fine-Point Printing
  Summagraphics Corporation says its new SummaColor Pro thermaltransfer printers use the company's MicroDot technology—a variable—dot-size control system. The system automatically configures the optimum dot size for every print job to ensure fast, high-quality color output. Model 1311 (\$6495) supports letter- and legalsize paper; the tabloid-size Model 1317 costs \$8995. Both include Adobe PostScript Level 2 and color matching. 512/835-0900.

sion is available for \$11,999. The Proof-Positive 3.0 is also available with Adobe's Configurable PostScript Interpreter Level 2, a Power Mac—native RIP that promises rasterization up to 400 percent faster than on 680X0-based ProofPositive printers. The full-page PostScript version is \$6499; a two-page configuration retails for \$13,999. The rasterizing is handled by the Mac CPU. All versions of the Proof-Positive offer background printing and Radius's SuperSWOP color-matching system. Radius, 408/955-1556.

-JAMES A. MARTIN

GRAPHICS

## Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: David Teich, a digital illustrator and animator based in Roosevelt, New Jersey, has been creating computer graphics since 1985.

How It Was Done: For this image, designed to illustrate cross-platform file transfer, Teich used a form of 3-D extrusion known as a path sweep. Whereas normal extrusion pushes the outline of a 2-D shape through space to give it depth, a path sweep extrudes the shape along a path—in this case, a spiral drawn in three-dimensional space.

Using the 3-D modeler formZ, Teich first generated a wire frame of a revolved sphere with the spherical-solids tool. With the section tool, he divided the sphere into 23 horizontal circles, then deleted the 11 sections below the center. In the top view, he drew 12 two-dimensional rectangles; after moving each rectangle vertically to match its corresponding circle in the side view, he deleted the remaining circles.

Using the polyline tool with Snap to Point set, he drew an angular spiral by snapping to one corner of the top rectangle, drawing a line down and clockwise, and snapping to the next point on the next rectangle, repeating the process until he had reached the last point on the last rectangle.

To create the source shape for the extrusion, Teich first drew a simple 2-D arc. With the sweep tool, he selected the arc and then the spiral path to create the swept shape. After placing the shape, he made a mirror image of it using the mirror tool in copy mode.

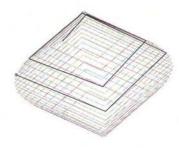
Before importing the model into ElectricImage for rendering, Teich created texture maps for each shape in Photoshop. For the apple, he used the gradient tool to make a horizontal redto-green blend, then applied KPT's Pixelwind filter to roughen the surface. For the rough, dimpled surface of the orange peel, Teich created a bump map in an alpha channel by applying the Noise, Diffuse, and Blur filters, and then using Levels to heighten the contrast.



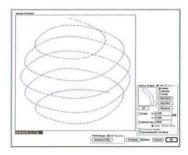
After generating a wire frame of a revolved sphere using formZ's spherical-solids tool, Teich used the section tool to divide the sphere into 23 circles.



After drawing the rectangles and matching each to the size and position of its corresponding circle, he deleted the remaining circles and used the mirror tool in copy mode to create a mirrored set of rectangles below the center line.



Teich used formZ's polyline tool to create an angular spiral by snapping to a point on one rectangle and drawing a line to the next point on the next rectangle, continuing until all the rectangles were connected.



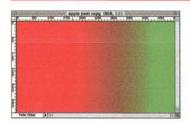
4 After he converted the line to a smooth curve, Teich created the sweep path by selecting the arc and the spiral path in the Sweep dialog box, where he adjusted the size and angle of the source shape on the path.

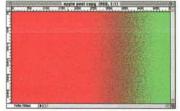


The swept shape shown in shade mode after it was returned to the modeling window.

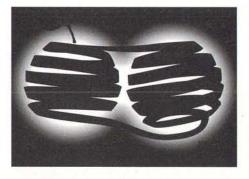


6 The horizontal linear blend Teich created in Photoshop as the basis for the surface texture he would map onto the apple.





10 To create the glowing outline around the objects, Teich first duplicated the alpha channel he'd created of the extruded-path objects. After applying Gaussian Blur to the duplicate, he loaded the original alpha channel into it and deleted the selected area to black. With the new channel loaded into the RGB image, he lightened the selected area with the Levels command.



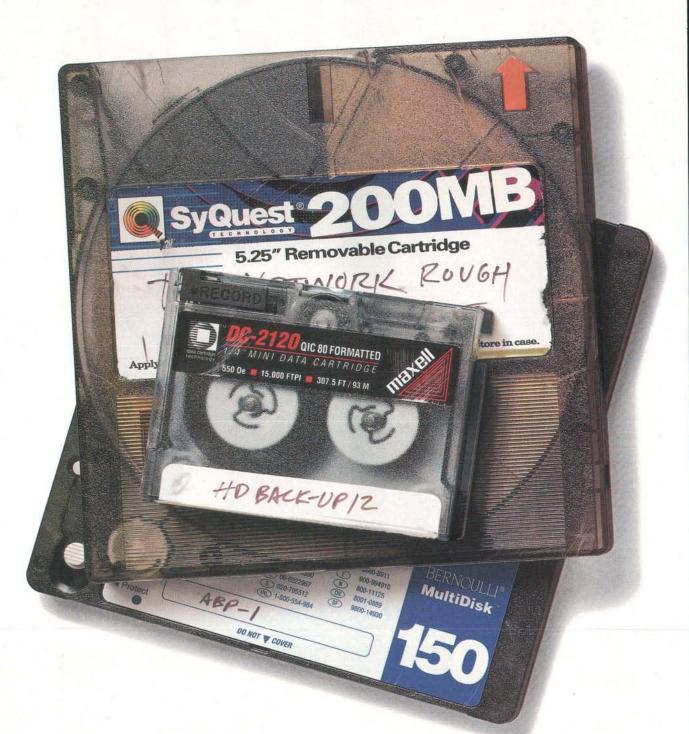
The apple's texture map after he applied KPT's Pixelwind filter in Photoshop to create a rough surface.

#### THE TOOLS

Hardware: Mac 840AV with 64MB of RAM and 1GB internal hard drive; Radius LeMansGT 24-bit accelerated graphics card; RasterOps 20T (20-inch) color monitor; Wacom UD-1212 graphics tablet.

Software: autodessys formZ 2.6.1; ElectricImage Animation System 2.0; Adobe Photoshop 3.0; Xaos Tools' Terrazzo 1.0; Kai's Power Tools 2.0.

## TIRED.



## WIRED.

MAGNETO - OPTICAL DISK

Tired of space limitations? Lost data? Expensive cartridges? The old storage technology is just that. Old.

Get wired! With the Fujitsu DynaMO™ optical drive, the new

**DVI**10230

standard in highcapacity

data storage, you can reliably store and transport all kinds of large files. Even the most demanding graphics

and multimedia applications.

DynaMO's industry-standard, 3.5" 230MB cartridges provide greater storage capacity for about 17¢ per megabyte. So you

DYNAMO SPECIFICATIONS

128-230MB

2.1 MB/SEC.

3,600 RPM

LIFETIME

30 MS

2 LBS.

CAPACITY

DATA TRANSFER RATE

AVERAGE SEEK TIME

ROTATIONAL SPEED

DISK WARRANTY

WEIGHT



Warrantied for life, DynaMO 230MB disks provide an absolutely reliable, inexpensive and high performance way to store and transfer files.

can save larger files while you save money.

DynaMO also protects your data better. Since it uses

magneto-optical media, DynaMO is immune to the problems that plague removable magnetic media. It's

simply the most stable medium you can buy for transporting files or storing them.

That's why DynaMO disks come with an exclusive lifetime

warranty from Fujitsu, the world's second largest computer company.

And no matter what your application, from color separations to multimedia to backing up, DynaMO is faster than ever before. Up to 60% faster in the Mac version equipped with Turbo MO software.

No wonder

DynaMO outsells all other optical drives. Highest performance, lowest cost, unmatched reliability. Get DynaMO and you've got it wired.

1-800-898-1302



COMPUTERS, COMMUNICATIONS, MICROELECTRONICS EDITED BY DAN LITTMAN

## At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

#### Intuit Enters Business-Accounting Market

NTUIT'S QUICKBOOKS 3.0 FOR MACINtosh is designed to make small-business accounting a point-and-click affair. Like Quicken, Intuit's personal-finance package, QuickBooks lets you enter data using electronic versions of familiar paper forms, such as checks and check registers. Unlike Quicken, however, QuickBooks provides a full set of accounting features and finance tools, including inventory management and reporting, invoicing,

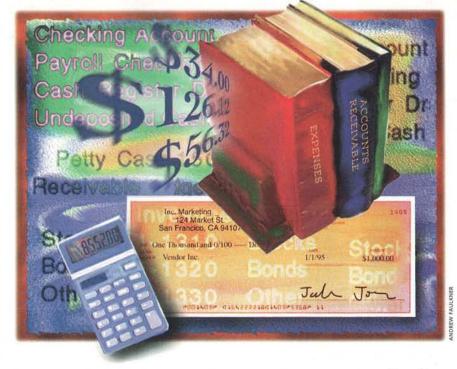
and payroll.

With QuickBooks, a small-business owner can generate an invoice within a few minutes of installing the softwareyou don't have to set up a complete chart of accounts first. The program can quickly generate a variety of customizable reports and graphs covering any period of time-such as a weekly income versus weekly expenses comparison. Quick-Books also automatically creates purchase orders, keeps track of available and onorder goods, and maintains an audit trail of all changes to the data. The program can track inventory under several different scenarios-you can record complete or partial shipments, for instance-and enables users to edit a transaction at any time. QuickBooks should be available by the time you read this at an estimated street price of \$119. Intuit, 415/322-0573.—JAMES A. MARTIN

#### Big Sales System

N THE QUEST TO PROVIDE WHATEVER it takes to close a sale, companies are turning to increasingly sophisticated software to help manage the sales process.

Altro Solutions, which develops custom sales systems for large companies, is marketing a package called Business Partner that runs on an Oracle server with a



tasks, such as tracking leads through the buying cycle; managing a sales team's contacts with multiple decision-makers at the client site; and projecting which deals will close and how much revenue they will generate. The system provides unusual capabilities as well. For example, all data is stored and transferred independently of the sales-tracking process, which makes it possible for a Business Partner user to extract a product's price and specifications and give that information on CD-ROM to clients and potential clients; to build a multimedia presentation into a certain stage of the sales pitch;

or to upload and download leads, client

assignments, and call reports via public

online systems.

Mac front end. Business Partner provides

tools for standard sales-management

Business Partner pricing depends on the number of users and how much customization Altro performs. Altro Solutions, 408/345-4600.—D.L.

#### It's in the Cards

OTEBOOK-BASED ORGANIZING SYStems are going digital. A while ago Franklin Quest published Ascend, a Mac version of its Day Planner; now Executive ScanCard Systems is shipping its ScanCard as a Mac application.

ScanCard—the paper version, and especially the digital version—differs significantly from the calendar-and-contact-list design of other organizers. ScanCard is based on grouping related file cards

together in the pockets of a portfolio. For example, contact cards for people involved in Project X and task cards for activities for that project would go in a pocket marked Project X.

A paper card can be grouped with only one project at a time, of course, but that does not apply on the Macintosh; a ScanCard card can be associated with any number of projects, with time and date stamps and with reminders to act on a card at some future moment. Scan-Card cards are not limited in size, and if the standard forms don't provide a place to record the information you need, you can design new forms. ScanCard can also search cards by con-



In ScanCard you can design card formats for managing information and store cards in a computerized wallet.

tents, priority, and type (though not, unfortunately, by dates). ScanCard version 1.0 lists for \$149.95 from Planning Works, 614/436-5300,-D.L.

#### @Risk Takes Another Chance



PALISADE CORPORATION is upgrading @Risk, its riskanalysis add-in for Microsoft Excel, to version 2.0, with seven new distributions and other new analysis features.

When modeling a business, a manufacturing process, or other quantifiable system in a spreadsheet, you normally provide a single value for each variablefor example, raw materials will cost \$500,000, or a certain task will take seven days. With a Monte Carlo simulator such as @Risk, you estimate how likely your variables are to fall somewhere within a range of values that you establish as lower and upper limits.

Version 2.0's new probability distributions include extreme value, inverse Gaussian, log-logistic, Pearson type V and type VI, Rayleigh, and student's t. Version 2.0 can also perform sensitivity analysis to determine which variables have the greatest impact on the outcome, and can run multiple simulations using different distributions and then display the results side by side.



@Risk should ship in January 1995 for \$395, will be available in native Power Mac mode, and will run with Excel 4.0 or 5.0. Palisade, 607/277-8000.-D.L.

#### Mapping Excel Data

T'S NO SURPRISE THAT THIRD-PARTY developers are steadily churning out specialized add-ins for Microsoft Excel: between Excel 5.0's Visual Basic for Applications, which simplifies developing add-ins, and Excel's near-ubiquity on the Mac, we can expect to see a steady stream of them. To wit, Excel for the Mac now boasts a map-

drawing add-in like the one Lotus recently released for the Windows version of its spreadsheet, 1-2-3.

MapLand, developed and published by Software Illustrated, can read data from Excel files and display it on maps. For example, MapLand could break a table of sales results into ranges such as less than \$1 million, \$1 million to \$5 million, and more than \$5 million, and then color each state according to the range it falls in. For more than one

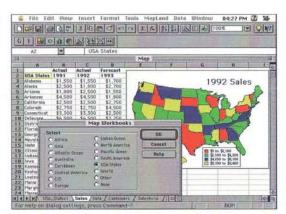
data series-for example, a product line-MapLand can overlay column or pie charts on states. All of Excel's calculation, formatting, and other tools are accessible from within MapLand.

MapLand should ship in January 1995 for \$99.95 with some geographical data, including U.S. state boundaries and

#### IN BRIEF

FileGuard Adds Encryption ASD Software is developing version 3.0 of its security utility, FileGuard, and a new security product, FileGuard Remote. File-Guard 3.0 includes DES and triple DES encryption and provides a disk-wiping function; Remote allows a security administrator to install and configure FileGuard across a network. The products should ship sometime this spring; pricing was not available at press time. 909/624-2594.

Magna Pumps Up Empower Magna is upgrading its security product, Empower, with a new set of administration capabilities. Empower 5.0, which should ship in March 1995, will allow an administrator to control which of Empower's security features network users have access to-for example, disabling encryption for some users. Configuration can be performed by dragging a configuration file from one machine to another over the network, a process that eliminates the need to go from desk to desk; and the contents of the Apple Guide-based help system can be modified by the administrator. Version 5.0's price was not set at press time. Magna, 408/879-7900.



MapLand reads data from Excel worksheets, interprets fields containing geographical information, and displays the data on a map inside Excel.

national boundaries for all regions of the world. Complete sets of U.S. county boundaries or zip code boundaries are \$139.95 per set. Software Illustrated, 510/463-9898.-D.L.

An exclusive invitation for

## **Macworld Active Buyers**



acworld cordially invites you to attend an exclusive and complimentary ACTIVE BUYER DAY in 1995!

Interact with 20 top Macintosh developers and resellers, see private demos, take advantage of special event discounts and participate in the Active Buyer Sweepstakes where thousands of dollars of Macintosh hardware and software will be given away at each event!

Each event is entirely complimentary and includes lunch and a cocktail reception.

Attendance is limited and exclusively for qualified Active Buyers, so register today. A *Macworld* representative will contact you with additional information.

### Graphics

New York City, April 19

### Multimedia

San Francisco, June 14

### **Mobile Computing**

Austin, October 11

Yes! I'm a Macworld Active Buyer. Contact me about attending this exclusive event:

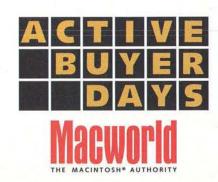
Graphics

New York, April 19
Multimedia

San Francisco, June 14

Mobile Computing Austin, October 11

Name			
Title			
Company			
Address	- 2		
City		State	Zip
Phone		Fax	



Mail to Macworld Active Buyer Day, 501 Second Street, San Francisco, CA 94107, or fax to 415.442.0766



BY JIM HEID

# Working Smart

## Quick Fixes for Speed Addicts

I'VE BEEN ADDICTED TO SPEED FOR years. I need it from the moment I start up until the moment I shut down, and it makes me feel irritable when I don't get enough.

Know what I mean? You can't own a computer for long before the twitching begins. Why doesn't that program start up more quickly? Why does the new version of WizzyWow Pro ooze like a glacier? Why does the CD-ROM drive run in slow motion? Why do cobwebs form during print jobs?

You need a fix. The most satisfying fix is, of course, a new and faster Mac-but even that high won't last forever. There's a better way to satisfy your craving: understand what makes some operations and components slow, and take steps to

speed them up.

#### **Disk-Intensive Tasks Are Slow**

Bottlenecks: (1) The disk drive is too slow. (2) Files are fragmented—that is, scattered in pieces across the hard drive. (3) Too many fonts.

Solution 1a: Get a Faster Drive High-capacity hard drives-500MB and larger—are considerably faster than the 230MB and smaller drives many Macs ship with. To realize the best speed gains from a high-capacity hard drive, store your applications and your System Folder on it and use the Startup Disk control panel to designate it as the drive to use at start-up.

Solution 1b: Use a RAM Disk and The best way to eliminate the hard disk bottleneck is to bypass the hard disk entirely with a RAM disk, a piece of high-speed memory that takes the place of the much slower hard drive. If your Mac has plenty of RAM-at least 16MB, preferably more-use the Memory control panel to create a RAM disk large enough to hold the System Folder and an application program you want to speed up. After copying the System Folder to the RAM disk, use the Startup Disk control panel to designate the RAM disk as the start-up disk. A RAM disk will survive a restart, though not a shutdown.

Alas, today's bloated system software and applications demand a Texas-size RAM disk. Try putting the RAM disk's System Folder on a diet: eliminate help files, unessential printer drivers and control panels, and the like. Or use Connectix Corporation's Maxima (\$99; 415/571-5100, 800/950-5880), which can create a double-size RAM disk (for example, setting aside 8MB of RAM yields a 16MB RAM disk). Maxima's memory-doubling tricks slow a RAM disk slightly, but you'll still get much better performance.



A RAM disk's memory is unavailable for general system use, so consider tossing in Jump Development's OptiMem (\$129; 412/681-2692), a utility that uses RAM-juggling techniques to fit more programs in memory. Unlike Maxima (and its cousin, Connectix's \$99 RAM Doubler), OptiMem doesn't expand the Mac's memory; it optimizes how programs use the existing memory.

The RAM cache in System 7.5's Memory control panel can also yield a modest speed improvement. If you have more than 8MB of memory, consider creating a cache of between 512K and 1024K. But don't go overboard: as with a RAM disk, the cache memory isn't available to run programs.

Solution 2: Tune Performance If you frequently add and remove files on your hard drive, use a disk optimizer to reduce fragmentation; these utilities store files in contiguous tracks and sectors so they're read quickly. Good disk optimizers include Alsoft's DiskExpress II (\$89.95; 713/353-4090, 800/257-6381); Central Point's Optimizer, which is part of Mac-Tools Pro (\$99; 503/690-8090, 800/937-9842); and Symantec's Speed Disk, which

> is part of Norton Utilities for Macintosh (\$149.95; 503/334-6054, 800/441-7234). (Note: Use Speed Disk version 3.1; version 3.0 contains a bug that can

damage data.)

If you have a reasonably fast Mac and a high-capacity hard drive, consider using FWB's Hard Disk ToolKit (\$199.95; 415/ 474-8055), Casa Blanca Works' Drive7 (\$79.95; 415/461-2227), or another special disk driver. These performance-tuning drivers can make a dramatic difference with fast Macs and high-capacity drives. For example, on my Quadra

840AV, Hard Disk ToolKit improved the transfer rate of a La Cie 1.2GB drive from 2MB per second to more than 3MB

per second.

Solution 3: Run Lean If launching programs seems particularly slow, try pruning your font collection. Each application has to generate its font menu as it loads by scanning the System Folder for fonts-and the more fonts you have, the longer it takes. This phenomenon reaches its crescendo in Microsoft Word 6 because, according to Microsoft, the continues

application checks each font to ensure that it's not corrupted.

If you're on America Online or eWorld, visit the Macworld Online software library and download the text file Hard Drive Speedup Tips. It contains more background on optimizers and drivers and more details on steps you can take to boost hard drive performance.

#### Scrolling and Zooming Are Slow

**Bottlenecks:** (1) High video bit depths. (2) Complex graphics.

Solution 1: Lower Bit Depths I discussed this issue in January's column, so I won't go into detail here. Just remember: on color Macs, documents scroll and zoom faster, Finder folders open more quickly, and windows update faster when the Monitors control panel is set to display fewer colors or gray shades. Scrolling, zooming, and manipulating windows are probably the most common tasks you perform, so using lower bit depths (for example, 16 or 256 colors instead of thousands or millions) can make a significant difference.

Solution 2: Use Draft-Mode Display Many word processors and desktop publishing programs can display blank or gray boxes in place of graphics (a technique called greeking). Using draft-display mode speeds up scrolling and zooming significantly, especially with documents containing complex illustrations.

#### **Printing Takes Too Long**

**Bottlenecks:** (1) Too many foreground tasks. (2) Too many downloadable PostScript fonts. (3) Slow LocalTalk cabling. (4) Overly complex print jobs. (5) Slow printer.

Solution 1: Limit Background Printing
System 7's background-printing feature
lets you get back to work within moments
after you send a file to print. However,
that actually slows printing, since the Mac
has to juggle the print job and your foreground activities. You can get your output
a bit sooner by disabling background
printing—but you'll have to twiddle your
thumbs while the job prints. A better way
is to avoid complex foreground tasks, such
as using a modem or scanner, while a document prints in the background.

Solution 2: Download Oft-Used Fonts Your Mac automatically transfers downloadable fonts with a print job from the hard drive to the printer; the printer then purges them after it outputs the job. Each downloadable font takes up to 30 seconds to travel over LocalTalk cabling—and that bogs down traffic on your network.

If you start each day by manually downloading frequently used fonts with a program like LaserWriter Utility included with Apple PostScript printers, the fonts stay in the printer until you restart it or turn it off (see "Manual Downloading Options"). That saves time and reduces network traffic, but it leaves less memory available in the printer for automatically downloaded fonts and for complex print jobs. Strike a balance by downloading only the few fonts you use most.

The best way to deal with downloadable fonts is to add a hard drive to your printer (if it accepts one). The printer can retrieve downloadables from the hard drive almost instantly. But don't delete the printer font files from your Mac's hard disk—if you use Adobe Type Manager you'll need them to get sharp onscreen text.

Solution 3: Use Ethernet Nearly all current Macs and many printers include built-in Ethernet, which can transfer files and fonts many times faster than can LocalTalk. Most people think of Ethernet as being suitable only for large networks, but its ability to spew data at warp speeds makes it ideal for even a one-Mac-one-printer network—particularly if you routinely print scanned images and downloadable fonts.

Solution 4: Simplify Print Jobs Printing requires extensive calculations to convert font outlines into characters of the required size, and to process the Post-Script or QuickDraw instructions that describe images. The more fonts, type sizes, and images a document contains, the longer you'll wait to see it. This applies to PostScript and non-PostScript printers alike. You can cut printing times by using fewer fonts and type sizes in a document. (This isn't a bad idea from an aesthetic viewpoint, either.)

Solution 5: Print in Draft Mode As with scrolling, you can speed up printing by greeking images. If you're just proofing a layout, use the draft-printing option in the application's Print or Page Setup dialog box to print blank placeholders in place of the graphics.

#### **Slow Multimedia Performance**

**Bottlenecks:** (1) CD-ROM technology is just slow. (2) QuickTime playback demands different setup than do other uses of CD-ROM.

Solution 1: Optimize System Settings For QuickTime-movie playback, turn off virtual memory, file sharing, and the View control panel's Calculate Folder Sizes option. These steps will boost your Mac's overall performance, too. If you have an older, single-speed CD-ROM drive, consider upgrading to a double-speed model (Apple's drives are excellent). And if you aren't using QuickTime 2.0, try it out—it might help.

Solution 2: Use Caching Utilities A CD-ROM-caching utility-such as FWB's CD-ROM ToolKit (\$79; 415/ 474-8055), Casa Blanca Works' DriveCD (\$79.95; 415/461-2227), Shirt Pocket Software's SpeedyCD (602/966-7667), CharisMac Engineering's AutoCache (\$79.95; 916/885-4420, 800/487-4420), or Insignia Solutions' RapidCD (\$69.95; 415/694-7600, 800/848-7677)—can boost performance by stashing recently accessed data in memory or on the hard drive. If the data is needed again, it's retrieved from the cache instead of from the slow CD-ROM drive. (DriveCD lacks a disk-caching feature; it caches to RAM only. DriveCD can also block the display of icons on the CD, making a continues

#### AVOID POWER MAC SNAGS

here Power Mac performance tuning is concerned, one area is of special concern: extensions and control panels that patch the Mac's system software. A number of utilities—from screen savers to keyboard enhancers—install patches; for example, CE Software's QuicKeys patches keyboard routines to work its macro magic.

But when patches are written in 680XO code instead of native PowerPC code, they force Power Macs to spend more time in emulation mode and switching between emulation and native modes. That can really slow performance, even when you run native-mode applications. I've heard of cases where a single start-up file caused as much as a 40 percent decrease in performance.

How can you tell if a given utility installs 680X0 patches? One way is to look for the "Accelerated for Power Macintosh" sticker on the software's box; if it's there, you can probably relax. Another way is to install Casady & Greene's Conflict Catcher II, a utility that can analyze extensions and detail which ones install 680X0 patches. It's a great way to tune the performance of a Power Mac. If you find an extension or control panel that patches over native code, you might want to stop using it until a native Power Mac upgrade is available.

#### ADDISON-WESLEY PUBLISHING CO.

#### **JUST ONE OF THE 1.4 MILLION** SATISFIED QUICKMAIL **CUSTOMERS WORLDWIDE**

OuickMail continues to win awards and receive high ratings. Like four "diamonds" from MacWEEK. Or the readers of Macworld selecting it as the best E-mail system in 1994. But the true measure of

success is the millions of satisfied customers. like Addison-Wesley, who depend on QuickMail every day.

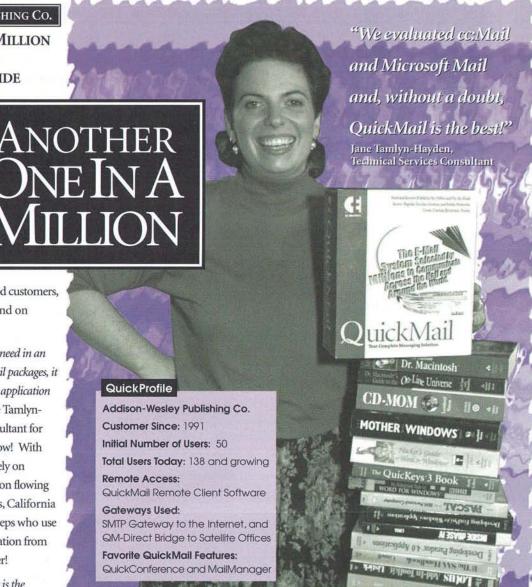
"QuickMail has exactly what you need in an E-mail system ... unlike other mail packages, it doesn't bog you down with a huge application or unnecessary features," said Jane Tamlyn-Hayden, Technical Services Consultant for Addison-Wesley. She should know! With more than 130 employees who rely on QuickMail to keep communication flowing between offices in Massachusetts, California and New York, and the 12 sales reps who use OuickMail to access vital information from the road, QuickMail has to deliver!

"We selected QuickMail because it is the only E-mail program that allows our people to work the way they want to work. We are now using QuickMail not just as an E-mail program for quick notes, but as our main business communication tool."

#### Put QuickMail to work for you!

Streamlined communications, efficient file transfers, and the ability to conveniently and inexpensively communicate across the hall and around the world - that's QuickMail.

Discover why more than 1.4 million customers (like Addison-Wesley) selected QuickMail. Complete the order form and we'll send you a complete QuickMail electronic mail system ... absolutely FREE.



#### Only QuickMail delivers a comprehensive E-mail system all in one box.

- Easy-to-install E-mail server and administrator software
- Clients for Mac, Windows, and DOS
- MailManager<sup>™</sup> (rules), to simplify mailbox management
- QM Remote<sup>™</sup> to send and receive E-mail from the road
- QM Forms<sup>™</sup> to create custom forms

- QuickConference™ to communicate in real time on-screen
- Built-in spell checker and powerful searching capabilities
- Free bridges and gateways

No other E-mail system on any platform delivers all this in one box.



Name	Charge \$9.95 for shipping	
Company	and handling and send me the QuickMail CD-ROM*	
Address		
City/St./Zip		
Phone	Cardholder Signature	
Fox	Offer expires May 1, 1995.	

Fax to 515-221-2694 or Call 1-800-523-7638 CE678

\*Each CD-ROM includes all software that is standard in QuickMail packages and allows you to set up three full working users. Current QuickMail customers are not eligible for this CD-ROM promotion. Offer valid only in the United States and Canada. Limit one CD-ROM per location. @1995 CE Software, Inc. QuickMail is a trademark of CE Software, Inc. All other trademarks or registered trademarks are the sole property of their respective companies.

## Now, make your Quadra as fast as a Power Macintosh 8100!

Introducing the 100 MHz PowerPro 601 from DayStar. This new upgrade card will make your Quadra 610, 650,



10-10

20

700, 900, 950, 800, Centris 610 or 650 as fast as a Power Macintosh 8100 for considerably less than a new machine. DayStar has taken the superfast 100 MHz PowerPC processor and built an upgrade card for Quadra users. This card provides the same unsurpassed compatibility as our PowerPro with RAM expansion, only without the RAM. You get pure, nocompromise speed, in a simple to install upgrade card that also allows you to run your older applications in 68040 model

Lower prices for Quadra users. DayStar's PowerPro 601 with RAM expansion has a new low price too! You can get Power Macintosh performance with the ability to install up to 128 MB of additional RAM for even less.

**Great news for Mac IIci owners.** One of our newest PowerPC upgrades — DayStar's 66 MHz Turbo 601 is designed just for you. This new upgrade uses your existing RAM and plugs into the Mac IIci's PDS connector so it doesn't use up a NuBus slot. Just Plug in and go!

#### Plus, PowerPC for entry level Mac's.

DayStar's new PowerCard 601 will give your Quadra, Performa or LC 470 series, 570 series, 605 or 630 series true PowerPC performance. It comes with its own installation kit so that you can be up and running at PowerPC speeds in minutes in your home or office.

#### DayStar lets you plug in new speed.

Now you have even more upgrade choices, that deliver blazing PowerPC speeds, at lower prices than ever before.

Call DayStar and go faster... 800-962-2077!

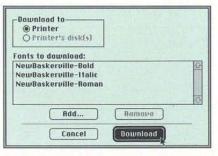


Get the Fax! Call DayStar's FaxBack at 800-438-0370 and order documents #6041, #4008, #4007.

© 1995, All brands and product names are trademarks or registered trademarks of their respective holders. Product specifications, StarPrices and promotions are subject to change without natice or obligation.

DayStar Digital, Inc., 5556 Atlanta Highway, Flowery Branch, GA 30542 • (404) 967-2077, Fax:

Circle 7 on reader service card



utura Set Futur	⊕ New Set
FuturOb1	THE INCLUSER
FuturExtBolOb1	Open Set
FuturHea	Save Set
	Save As
	Close Set
	Add File
	Remove
	Choose
Ignore file-not-fou	nd errors Printer

Manual Downloading Options Apple's Laser-Writer Utility (top) lets you manually download fonts to PostScript printers. Manuel Velosa's shareware Startup Downloader (bottom) is more convenient—it allows you to create font sets you can download with a double-click.

disc's window appear much sooner on the Mac's desktop.)

CD-caching utilities also provide prefetch caches that guess which information the Macintosh will need next and read it into memory before it's required. For QuickTime-intensive CDs, prefetching can actually slow performance and cause jerkiness, but prefetching is very effective with other kinds of CDs, such as text archives.

Finally, if you have an older, single-speed CD-ROM drive, a caching utility will also bring your audio and Photo CD capabilities up-to-date. In particular, FWB's CD-ROM ToolKit has outstanding audio-CD support, including the ability to extract audio tracks and create disk files of their contents—an important feature for presenters and multimedia producers. **m** 

Next month: Coping with font overload

Contributing editor and speed addict JIM HEID is the author-producer of Macworld Complete Mac Handbook Plus Interactive CD, third edition; the author of Macworld Word 6 Companion; and the producer of Macworld Ultimate Mac CD, all published in 1994 by IDG Books Worldwide.



# 5 MINUTES TO FREEDOM

## INSTANT INTERNET ACCESS



Forget on-line services; InterRamp connects you <u>directly</u> to the Internet. That's the <u>BIG</u> difference.

In less than 5 minutes, you'll have access to MOSAIC, Gopher, WAIS, Veronica, Archie, ftp, E-Mail, NEWS and other hot Internet applications. You have the entire world-wide Internet at your fingertips.

Just a few clicks of your mouse, you're connected.

All applications are automatically configured for immediate use. It's that <u>SIMPLE</u>.

We're so sure you'll love Instant InterRamp, we'll let you try it absolutely <u>FREE</u> without any obligation.

All you need is a computer and a modem; we'll send you the Instant InterRamp software.\*

Also, PSI offers high-performance LAN Internet solutions for your organization. Ask our sales representative for more information.



CALL NOW FOR FREE DEMO 1.800.PSI.0852



PREFERRED CUSTOMER NUMBER #00141

FAXBACK INFO: 1.800.fax.psi.1 • Internet E-Mail: interramp-info@psi.com • World Wide Web: http://www.psi.net

Download the software from the Internet: http://www.psi.net/interramp/

<sup>\*</sup> Restrictions apply, FREE trial requires credit card for verification purposes only. • Performance Systems International, Inc. • 510 Huntmar Park Drive • Hernoon, VA 22070 • USA • ©1995 Performance Systems International, Inc., PSINet and the PSINet logo are registered trademarks. All other trademarks and service marks are used with their permission and remain the property of their respective ownes.





BY LON POOLE

# Quick Tips

## Tips, Tricks, and Shortcuts

IN A FEW MINUTES YOU CAN SOLVE A problem that has plagued Macintosh users since day one—the customary but dumb method of removing a disk from the Mac by dragging the disk icon to the Trash. Michael Wiant of Alexandria, Virginia, suggests you simply make an alias of the Trash, change the alias's name to Remove Disk, and paste a custom icon in the alias's Get Info window. Make the custom icon look like a hand removing a disk or a disk with an arrow pointing in the direction of ejection.

#### Freeware in Macworld Forums

All the freeware utilities mentioned in this column are available in the Macworld forums of America Online and eWorld.

#### Generic Icons after Rebuilding

When I rebuilt my desktop, all of my TeachText document icons went blank. What caused this, and how can I revert their appearance?

Jethro O. Miller via the Internet

Maybe the Finder couldn't locate the documents' creator application while rebuilding the desktop database, so it substituted a generic document icon (a blank page with a corner turned down). Make sure TeachText or SimpleText is on the disk and rebuild the desktop again. If the application is not on the same disk as the document, make sure you rebuild the application's disk before you rebuild the document's disk.

If TeachText or SimpleText was present when you rebuilt, perhaps its bundle bit is somehow no longer set. (The bundle bit is an internal setting that designates that an application has nongeneric document icons.) Disk-utility software such as Norton Disk Doctor and MacTools Pro, both from Symantec, can reset

bundle bits semiautomatically. You can also set a program's bundle bit with the Get File/Folder Info command in Res-Edit's File menu (check the Has BNDL option). Apple's Disk First Aid application fixes many disk problems but does not fix bundle bits.

Another possibility: if Super ATM 3.5 is installed when you rebuild the desktop, some icons become generic and some documents will no longer open when you

double-click them. Until you upgrade ATM, you can work around this problem by rebuilding with extensions off. Here's a one-pass method for System 7 users: hold down the shift key while restarting; when you see the message "Welcome to Macintosh Extensions Off," release the shift key and immediately hold down the ## and option keys until another message asks if you want to rebuild the desktop on the start-up disk.

Desktop-rebuilding problems can also be the result of damaged desktop files. Try clearing the desktop database with either of two freeware programs: Reset DTDBs 2.0 or TechTool 1.0.6, and then rebuild again.

If you have problems with a custom disk icon, try the freeware utility Disk Rejuvenator from Aladdin Systems. If you have problems with a custom folder icon, drag the folder's contents to a new folder and then drag the troublesome, nowempty folder to the Trash.

#### Recording from an Audio CD

I own a Quadra 650 with an internal CD-ROM drive. Is there no way to capture audio directly from a CD, even in mono?

Joshua Dowd Greenville, North Carolina

Unplugging the microphone is the key to recording directly from an audio CD in the internal CD-ROM drive of a Quadra or Centris 610 or 650, a Quadra 800, a Mac IIvx or IIvi, or a Performa 600CD. If the microphone is plugged into the port on a monitor, such as Apple's 16-inch dis-

play, then you must unplug the cable that connects to the microphone port on the computer. When nothing is plugged into the microphone port, those models record 8-bit monophonic sound (both stereo channels mixed together) from the internal CD-ROM drive. When something is plugged into the microphone port, those models take sound-input from that port. You cannot switch sound-input sources with the Sound control panel on those Mac models as you can on a continues

Quadra 630, 660AV, 840AV, or 950; the LC or Performa 570CD series; or any Power Mac.

To connect an external CD-ROM drive's output ports to your Mac's microphone port, you need a patch cord that fits your Mac's sound-input capabilities (see *Quick Tips*, February 1995 and August 1994).

To record short segments of an audio CD, use the freeware utility GrabAudio by Theo Vosse. For a cheap way to record longer segments of an audio CD, see the sidebar, "CD Audio in Movies."

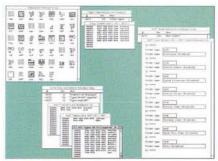
#### **Balky Scrapbook**

Recently my Scrapbook wouldn't open; I heard a beep but saw no error message. I had to replace the Scrapbook file, which was 2.7MB and contained complex graphics. What went wrong, and how can I access the original Scrapbook file (which I saved)?

Todd R. Coogen Hackettstown, New Jersey

If you recently upgraded to System 7.5, your Scrapbook became an application instead of a desk accessory. To see large pictures with the Scrapbook application, you must increase its memory size with the Finder's Get Info command. You'll have to experiment to find an optimum size, but start by increasing from the standard 256K to about twice the size of the largest picture in the Scrapbook. For example, if the Scrapbook contains a 259K picture (256 colors at 640 by 480 pixels), set Preferred Memory Size in the Scrapbook's Get Info window to 600K.

You can also access Scrapbook items with ResEdit, Apple's resource-editing application. First, open the Scrapbook file with ResEdit; then open a resource type (PICT for pictures, TEXT or styl for text, snd for sounds, moov for movies, and so on); and finally copy an individual resource, which corresponds to a Scrapbook item, for subsequent pasting elsewhere. The Scrapbook stores items as resources



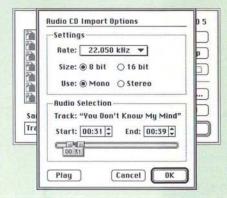
**Extensions Manager Resource Changes**These ResEdit windows show the changes needed to make Extensions Manager 3.0 take control of the Control Strip Modules, Shutdown Items, Apple Menu Items, and Fonts folders.

#### CD AUDIO IN MOVIES

ere's an easy, inexpensive way to record a passage from an audio CD as a sound file. (Keep in mind that you should not copy sounds from a CD—as with any other copyrighted material—without first obtaining permission from the copyright holder.) First you make a sound-only QuickTime movie, and then you convert it to an ordinary System 7 sound file or an AIFF (Audio Interchange File Format) file. This procedure works with an AppleCD 300 CD-ROM drive but not with an AppleCD SC or AppleCD 150 drive, and it requires QuickTime 1.6 or later. You

need an application that can open QuickTime movies, such as SimpleText 1.0 or later (Performa versions of SimpleText cannot open movies). You also need the freeware utilities Movie2Snd 1.1.1 by Scott Lindsey and SoundTrack by Manuel Veloso.

Choose Open from Simple-Text's File menu. In the directory dialog box that appears, open the audio CD, select the track you want to record, and click the Convert button. This brings up another directory dialog box, in



which you name the sound-only movie and select a folder location for it. Clicking this dialog box's Options button brings up the Audio CD Import Options dialog box (shown here). Adjust the slider controls to specify which part of the audio track to include and set the sound-quality options. After dismissing the Audio CD Import Options dialog box, click the previous dialog box's Save button. QuickTime copies the audio data from the CD to the movie file. If you want a System 7 sound file, drag the movie file to the Movie2Snd icon in the Finder. If you want an AIFF file, drag the movie to the SoundTrack icon.

in the resource fork of the Scrapbook file. A resource fork can contain up to 2727 resources and is limited to 16MB.

#### Stuck in the Past

How can I keep the time and date current? Every time I start up my LC, I'm sent back to 1956.

Bookman3 via America Online

Replace the lithium battery on the system board. The battery is next to the internal hard disk (SCSI) connector on the LC. When the Mac is off, the battery keeps the clock ticking and powers the parameter RAM (PRAM), which stores settings for many control panels, including Mouse, Keyboard, and Startup Disk. You could get the battery from a Macintosh dealer and replace it yourself, but you should consider having a technician do the work, since the system board can easily be damaged by static electricity or incorrect handling.

#### **Enhancing Extensions Manager 3.0**

Many people who upgraded to System 7.5 were undoubtedly disappointed with the new Extensions Manager 3.0. Compared with version 2.0.1, which is still distributed online as freeware, version 3.0 has a better interface but less functionality. It no longer controls fonts, start-up items, or Apple-menu items; and the advanced Customize File Types feature is gone. Here are a few Res-Edit tricks that restore the lost abilities to version 3.0. In fact, you can go beyond version 2.0.1 by adding control of items in the Control Strip Modules and Shutdown Items folders.

You begin by duplicating Extensions Manager 3.0 and opening the duplicate in ResEdit. To add folders you must edit two types of resources, FTyp and fld#. For example, the following steps describe how to add the Fonts folder:

1. Open the FTyp resource -4033 to bring up a resource-editing window for it. In that window, click an insertion point at the end of the text in the rightmost column and type fontfonD; here and elsewhere in ResEdit, carefully observe capitalization and don't press return.

2. Open the fld# resource -4033 and in its resource-editing window click the last numbered separator (\*\*\*\*\*) to select it. Choose Insert New Field(s) from the Resource menu, press tab to advance to

#### **More Extensions Manager Folders**

NEW FIELDS IN FLD# -4033

FTyp -4033	Folder Type	Folder Name
extnextD	extD	Extensions (Disabled)
ctrlctrD	ctrD	Control Panels (Disabled)
macsmacD	macD	System Extensions (Disabled)
sdevsdvD	sdvD	Control Strips (Disabled)
shdfshdD	shdD	Shutdown Items (Disabled)
strtstrD	strD	Startup Items (Disabled)
amnuamnD	amnD	Apple Menu Items (Disabled)
fontfonD	fonD	Fonts (Disabled)
	extnextD ctrlctrD macsmacD sdevsdvD shdfshdD strtstrD amnuamnD	extnextD extD ctrlctrD ctrD macsmacD macD sdevsdvD sdvD shdfshdD shdD strtstrD strD amnuamnD amnD

Make Extensions Manager 3.0 control more than the first three folders listed here by adding to its resources with ResEdit. For each additional folder, add the text listed here to FTyp resource -4033 and to new fields in fld# resource -4033.

the Folder Type field, and type fonD. Press tab again to advance to the Folder Name field, and type the two words Fonts (Disabled).

To add more folders to Extensions Manager 3.0, repeat the two steps above with other values from the table, "More Extensions Manager Folders." Note that you can change the order in which Extensions Manager lists folders by changing the order of the 8-character entries in the FTyp resource.

You're not quite done yet, because Extensions Manager displays only files whose file types are listed in the iNIT resources -4033 or -4034. Some important omissions are the file types for sound files (sfil), AppleScript scripts (osas), Control Strip modules (sdev), and components such as Apple Photo Access and MacinTalk Pro (thng). In addition, Extensions Manager includes the file type for font suitcases (FFIL) but not for individual TrueType fonts (tfil), bitmapped fonts (ffil), or PostScript fonts (LWFN). Open iNIT resource -4034, and at the end add the additional file types you want Extensions Manager to list. You must also doctor iNIT resource -4035, which lists the 4-character creator codes of files not displayed by Extensions Manager. Delete the DMOV creator from this resource so that you will be able to see all font suitcases listed in the Fonts folder (to do this, select the DMOV characters and press the delete key). The screen "Extensions Manager Resource Changes" shows the state of the iNIT, fld#, and FTyp resources with all the changes listed in the table, "More Extensions Manager Folders," in place.

Even with all these changes, you'll see only the system extensions and control panels that have INIT resources. Those resources—not to be confused with iNIT resources—contain software to be run during start-up. If you want Extensions Manager to list all control panels, you must delete file type cdev from the iNIT

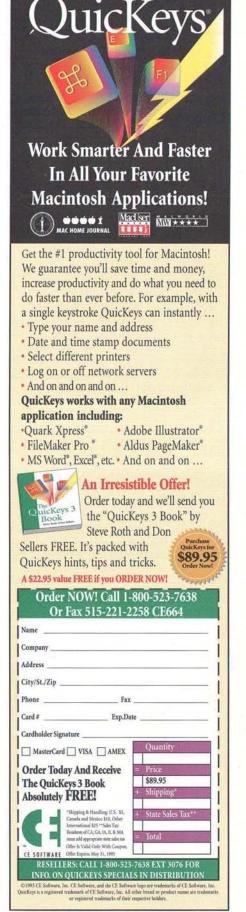
resource -4033. Delete file type INIT from that resource if you want Extensions Manager to list all system extensions. These last two changes won't have any effect unless you make one more change: open the cdev resource -4064 within Extensions Manager 3.0. In the editing window for that resource, scroll down until you see 000F00 in the leftmost column. Then look to the right across that row for 80 and change it to 00.

When you have finished making all the changes, save the Extensions Manager and quit ResEdit. Test your changes by double-clicking the modified version of Extensions Manager 3.0. Scroll through the file list and make sure everything appears as you expect. If a file does not show up, add its type to the iNIT resource -4034; you can determine a file's type with the Get File/Folder Info command in ResEdit's File menu. When you are satisfied with your new Extensions Manager, put it in the Control Panels folder and enjoy the enhanced features you have added.

William S. Peters Salt Lake City, Utah

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).



Circle 171 on reader service card

EDITED BY ELIZABETH DOUGHERTY

# Networks

THE LATEST IN CONNECTIVITY AND COMMUNICATIONS

## ISDN Heats Up

S TELEPHONE COMPANIES RAPIDLY deploy ISDN (Integrated Services Digital Network) throughout the United States, Europe, and Japan, Macintosh users are finally finding ISDN a popular route to cheap, high-speed communications. For as little as \$22 per month, an ISDN line provides two 64-Kbps data channels that can be combined, or bonded, into a single 128-Kbps channel—four times as fast as today's fastest modems. Equipment prices are dropping, too, with some products costing less than today's fastest modems.

Network managers put ISDN to work for three key applications. The first is point-to-point BBS and file transfer; a bonded ISDN connection can move a 10MB image file in less than 15 minutes-an hour-long chore using the fastest available modem. Second, ISDN works well for dial-on-demand network bridging, for example, to let a branch office or telecommuter access a LAN with vastly improved performance. When traffic needs to move between LANs, the bridge automatically establishes a linkmore quickly than Apple Remote Access can. The third key application, highspeed Internet access, also takes advantage of ISDN's dynamic connection and bandwidth-on-demand to let users appear to have a full-time Internet presence.

ISDN service costs less than other high-speed digital connections, such as digital data service and frame relay. ISDN service charges range from Pacific Bell's Home ISDN in California for \$22 per month plus 1 cent per minute for local daytime calls, to other providers' rates of up to \$100 per month or 4 cents per minute. Long-distance rates are the same for ISDN calls as for voice calls.

ISDN equipment prices range from \$500 for so-called ISDN modems to several thousand dollars for multiline ISDN



nection requires a network terminator (NT1), a black box that provides an active end point for the ISDN line, and a terminal adapter (TA), an interface between the ISDN line and computer equipment. Stand-alone NT1s cost between \$150 and \$500 and may include extra features, such as ports for analog phone lines. Com-Net Industries' (CNI) bare-bones WindRider NT1 costs \$150 on the street; IBM's 7845 NT1 costs \$350 on the street and includes

Some TAs have a built-in NT1. For example, AccessWorks Communications' QuickAccess (\$400 to \$650 street price) includes the NT1; it connects to a Mac's serial port and appears to the Mac as a high-speed modem—hence the term digital modem. Competing ISDN modems include Motorola's HTMA-200 (\$500 street price) and Adak Communications Corporation's model 221 (\$550 to \$700

an analog phone port with features such

as conference calling and speed dialing.

routers and bridges. Every ISDN con-

street price). Service bureaus can combine an ISDN modem with an ISDN-capable BBS package, such as SoftArc's First-Class, to provide customers with convenient high-speed file exchange.

Not all Macs have serial ports capable of 128 Kbps or even 56 Kbps. The serial ports on Quadra AV models and Power Macs can sustain speeds of up to 250 Kbps. Other Macs need an add-on card for ISDN connections.

A NuBus serial card, costing \$100 to \$200, makes it possible for a Mac with a slow serial port to talk effectively to an ISDN TA. Or consider an ISDN NuBus card, which lets you connect an ISDN line directly to your Mac. (All current ISDN NuBus cards require an external NT1.) ISDN NuBus cards support software routing of AppleTalk and TCP/IP traffic to the local network. The Planet ISDN board from Euronis has a street price of \$750 and includes an analog phone port. You can put up to six boards

/ID KAHL

in a single Mac to support multiple ISDN users or to provide bandwidth-on-demand. A software package called The Link, \$595 list price, from Euronis, bundles Apple's Apple Internet Router software with ISDN drivers to let you bridge traffic between Mac networks.

ISDN-capable bridges now cost no more than ISDN NuBus boards. The bridges connect directly to an Ethernet network and automatically move Apple-Talk and TCP/IP traffic across an ISDN link. The Pipeline 50HX ISDN bridge/router from Ascend Communications has a street price of \$800 and provides an integrated NT1, 128-Kbps bonding,

dynamic connections, and bandwidth-ondemand. A similar unit from Combinet, the Everywhere CB-160, costs \$950 on the street.

For sites that need multiple-user or higher-speed connections, Combinet and Ascend sell multiline ISDN bridges and routers that support bandwidths beyond 128 Kbps, at list prices ranging from \$2000 to \$7000.

AccessWorks, 908/721-1337; Adak, 517/882-5191; Ascend, 510/769-6001; CNI, 818/767-4440; Combinet, 408/522-9020; Euronis, 407/363-9008; IBM, 800/426-2255; Motorola, 205/430-8000.—MEL BECKMAN

## Vendors Outline 100-Mbps Strategies

ONSENSUS IS BEGINNING TO EMERGE on the 100-Mbps Ethernet debate. The largest players in the Macintosh Ethernet-card market—Apple Computer, Asanté Technologies, and Farallon Computing—have outlined product strategies that include supporting the emerging IEEE 802.3 100BaseT standard called Fast Ethernet. All three companies plan



plans to offer more PCI cards including an FDDI card, a multiport serial card, and 25-Mbps and 155-Mbps ATM cards.

Asanté plans to release a 10-Mbps PCMCIA card, a 100BaseTX PCI card priced under \$300, and a nonswitching 100BaseT hub in the first half of the year. In the third quarter, the company will take advantage of its own ASICs to produce a 10-Mbps Ethernet switch priced under \$200 per port; later in the year, an optional dedicated 100-Mbps connection will be offered for the switch. (Switching guarantees a network device dedicated bandwidth.) Asanté is also developing a cell-switched architecture, which will support ATM up to 155-Mbps and 10/100-Mbps Ethernet switching; stackable hubs based on this architecture will debut in the second half of the year.

Farallon will offer 100BaseTX cards based on technology licensed from 3Com Corporation. A NuBus card will ship in the spring, followed by a PCI card for Power Macs in the summer. Farallon also intends to ship a 100BaseTX workgroup hub and a bridge by the end of the year. Pricing was not set at press time.

Apple Computer, 408/862-3385; Asanté, 408/435-8388; Farallon Computing, 510/814-5100.—E.D.

to ship PCI (Peripheral Component Interconnect) 10/100-Mbps cards, which support both Ethernet speeds, when Apple ships PCI-based Macs in the second quarter. Specifically, the cards will be based on 100BaseTX, the part of the proposed standard that specifies category 5 unshielded twisted-pair cable. 100BaseTX combines the FDDI signaling scheme with standard Ethernet protocols to achieve 100-Mbps bandwidth.

When its PCI systems ship, Apple will offer 10-Mbps Ethernet, 10/100-Mbps Ethernet, and 4/16-Mbps Token Ring PCI cards. Later in the year, Apple

## Utility Encrypts AppleTalk Data

TEMI SOFTWARE'S NIGHTSHADE foils eavesdroppers by encrypting data on Apple Talk networks. NightShade is the first software-only product that automatically and transparently encrypts all Mac-to-Mac Apple Talk traffic.

NightShade protects all AppleTalk

#### IN BRIEF

Speedier AppleShare A version of AppleShare 4 designed specifically for the PowerPC-based Workgroup Servers 6150, 8150, and 9150 should run about 35 percent faster than the previous release, according to Apple, which plans to ship the software by midyear. Customers who purchased the machines after January 1, 1995, will be charged only for shipping and handling. Other upgrade prices were not set at press time. 408/862-3385.

A New NetModem/E
An updated NetModem/E 28.8
(\$1999) from Shiva has a V.34
modem, will support fax software
and ARA 2.0. It will simultaneously
route TCP/IP, IPX, and AppleTalk
over WAN connections. Shiva will
offer a trade-in program for previous versions when the network
modem ships in March.

Shiva has also released a free new version of its remote-access client, DINA 3.8, that supports Power Macs and System 7.5. The client, which works on the company's NetModem, TeleBridge, and EtherGate product lines, is available from Shiva's BBS (617/273-0023), AppleLink, CompuServe, and the Internet. 617/252-6300.

In Review See Reviews, elsewhere in this issue, for a look at NetWorks 3.0, a network-monitoring utility from Caravelle Networks Corporation.

applications, including AppleShare and System 7 file sharing. Network data is encrypted using the DES (data encryption standard) or Triple DES algorithms, or NightShade's own encryption system, designed for minimal impact on network performance. Macintoshes running NightShade can still communicate with unprotected systems.

For one user, NightShade lists for \$199 for Atemi's encryption scheme, \$99 for DES, and \$99 for Triple DES. A two-user Apple Remote Access pack, priced at \$399, includes all three encryption approaches. Volume discounts are available. The company expects to ship versions for Novell's NetWare for Macintosh, IPX, and TCP/IP in April. Atemi Software, 217/352-3688.

-JOEL SNYDER

Say you sell superior pedigree chow to

Say you sell superior pedigree chow to vets. Key in vet under business type, the area code or zip code for your part of the state, and up they'll pop. There are 12 vets listed in zip code 22031 in Fairfax, VA.

Now who do you want to find?

Call him Max. He's the little retriever icon in Select Phone you click on whenever you want to fetch a name, address or phone number from among the 84 million listings contained in this amazing Phonebook on CD-ROM.

Like a good hound, Max will scurry off through the megabyte brush to root up any listing — or any group of listings — by searching on a name, street address, city, zip code, area code, business heading — even SIC code. Once found, you're then free to call these names, mail to them or just drop them into your own personal database for an even greater plan of your own design. Get the idea? It's a tidal wave of information — unleashed. For the names of software

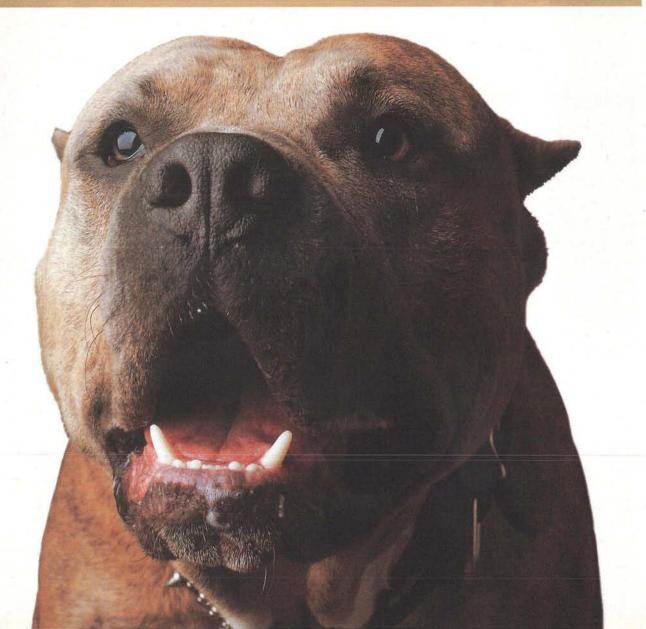
SELECT PLUCE 1995

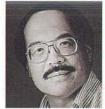
FIND WHAT YOU'VE BEEN MISSING.

Circle 217 on reader service card

stores carrying Select Phone, call 1-800-99-CD-ROM. Online go to sales@procd.com.

#### Need to look-up all the vets in Virginia? This will leave you drooling.





BY CARY LU

# Power Book Notes

### PowerBook Repairs

IF YOU HAVE TROUBLE WITH YOUR PowerBook, you should first consult Apple's *PowerBook Troubleshooting Guide*. This excellent 100-page booklet comes with recent PowerBooks and covers most common hardware and software problems for all models. But Apple says it has no way to get copies to owners of older PowerBooks.

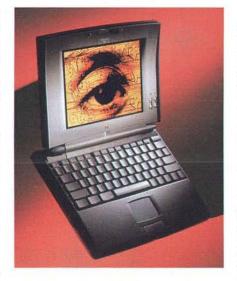
If you can't get a copy of the booklet or if it doesn't help you solve your problem, try user groups, online forums, or your dealer. Another source of information is the SOS-APPL line (800/767-2775), which generally offers good advice, though you may have a long wait before you talk with a support person.

**Diagnostic Software** 

Apple Personal Diagnostics (from Apple) and MacEKG (from MicroMat Computer Systems, 415/898-6227, 800/829-6227) run various hardware tests, and each sells for about \$100. MacEKG supplies more-detailed testing information, telling you which section of the mother-board circuits are faulty, while Apple's software simply gives an overall thumbsup or -down for the entire mother-board. You probably won't find either product very useful, since PowerBooks (or indeed desktop Macs) rarely suffer from the kinds of problems these programs diagnose.

**Doing It Yourself** 

Should you repair a PowerBook yourself? Only if you know exactly what you are doing. Opening a PowerBook does not void the warranty, but you are responsible for any damage you may cause. Every repair shop has seen PowerBooks damaged by users who tried to perform repairs or upgrades themselves. PowerBooks



contain much smaller and more-fragile components than do desktop computers. While the 100-series models are fairly easy to open up and work on, Duos are harder, and the 500-series models are exceptionally difficult to service. Pre-Owned Electronics (617/275-4600, 800/274-5343) stocks many PowerBook parts.

Consumer-electronics companies publish excellent service manuals for TVs and stereos, complete with circuit diagrams and detailed diagnostic information, but Apple does not publish anything remotely comparable for its computers. Apple's Service Source CD-ROM, available only to authorized repair centers, explains how to take apart any Mac, but its service information is limited to basic symptoms and subassembly replacement. It contains no circuit diagrams and describes no component repairs. Occasionally, old copies of this CD-ROM turn up at computer flea markets.

Anyone can browse Apple's technicalinformation library, available through several online services and the Internet (http://www.info.apple.com/til.html). Although it's a useful resource for technical notes, this library has little service information. Separate from Apple's offerings, you can find some service information written by users on the Internet; connect via FTP to an info-mac archive (ftp://mrcnext.cso.uiuc.edu/pub/infomac, ftp://ucs.ubc.ca/pub/mac/info-mac, ftp://hawaii.edu/mirrors/info-mac, and others) and browse the info/hardware folder. Global Village Communication's installation guides for its modems contain excellent PowerBook disassembly and assembly instructions. If you have a Global Village modem, you can get a guide for free if you sign an agreement that you will not hold the company responsible for anything you do to your PowerBook (see Global Village Communication's online support areas or call 408/523-1000). These guides deal only with modem installation; they don't explain any other process or how to do a complete disassembly.

**Choosing a Repair Shop** 

If your PowerBook is broken and the problem is covered by the warranty, calling SOS-APPL is the best choice. You have to ship your PowerBook to Apple, parting with it for at least a few days, but the overall repair time is often less than at a local Apple-authorized service center. Always back up any critical files before turning over any computer to be serviced; consider deleting sensitive files.

If your PowerBook is out of warranty, damaged by accident, or if you continues

MACWORLD April 1995 155

are in a great hurry, you can take it to an independent repair shop. The independents tend to work more quickly, and for some common repairs they charge much less than Apple-authorized service centers do. But not all repair places do good work, so to find a competent independent repair shop, check with a local user group first. (For a partial listing, see "Some Repair Shops.")

#### The Most Common Repairs

All prices include parts and labor.

Screens PowerBook displays rarely go bad by themselves-a good thing, since they are expensive to replace (\$300 to \$500 for passive matrix monochrome, \$800 to \$900 for active matrix gray-scale, and nearly \$2000 for active-matrix color). A scratched screen cannot be repaired, only replaced. The backlight should last for 10,000 to 15,000 hours (5 to 7 years at 40 hours per week); over this time, the brightness will drop by 50 percentnoticeable but usually not a problem. A replacement backlight costs about \$150. If the screen on a PowerBook 140, 145, or 170 flickers, intermittently goes black, or displays two horizontal black lines, try squeezing the right side of the bezel. If the image changes, you need a shim installed in the video connector (\$75).

Keyboards and Trackballs Duo and 500-series keyboards can behave erratically if the fastening screws are too tight or too loose. The keyboard screws are readily accessible from the bottom of the case. You can loosen or tighten them slightly with a Torx T-8 screwdriver. For the 500 series, you need a real T-8 screwdriver because the common T-8 tips for 1/4-inch hex-shaft screwdrivers won't reach the screws.

Trackballs need regular cleaning but otherwise rarely fail. Broken trackball switches may require trackball replacement, about \$140.

RAM Cards Some vendors have failed to follow Apple's specification for RAM cards. On 100-series PowerBooks, a memory card may work for several months, and then its contacts might fail through shock and vibration. For the 500 series, Apple specifies low-profile memory chips in SOJ (Small Outline, J lead) packaging for the RAM cards. Some companies use the slightly higher TSOP chips (Thin Small-Outline Package), which don't fit properly in the PowerBook and can even bulge out the keyboard. The problems typically show up as random software errors. Apple says memory cards for Duos rarely cause problems.

Motherboards Only two components on a PowerBook's motherboard are usually practical to repair: the battery fuse

#### SOME REPAIR SHOPS

ere's a brief sampling of highly regarded repair shops for all Macs, including Power-Books. None are Apple authorized; they often charge less and do more types of repairs than an authorized service center. Check with your local user group for repair shops in your area.

- CJS Systems, Berkeley, CA; 510/849-3730
- Ellar Engineering, Pasadena, CA; 818/578-0666
- Tekserve, New York, NY; 212/929-3645
- Mobile Macintosh, Austin, TX; 512/452-1113
- Westwind Computing, Seattle, WA; 206/522-3530

and the connectors. A 100-series Power-Book with a blown fuse will run off an AC adapter but not on battery power (check first to make sure the problem isn't the battery itself); loose connectors work intermittently and are particularly common on the PowerBook 100. In both cases, an Apple-authorized service center will replace the motherboard for between \$300 and \$500. An independent shop will replace the fuse or resolder the connectors for about \$50 to \$90.

AC Adapters The AC adapters for early 100-series PowerBooks had plugs that were prone to fail. The plastic insulation in the coaxial connector that plugs into the PowerBook tended to crack, producing a short that would blow the battery fuse. Apple will replace such defective AC adapters and repair the PowerBook without charge (even if it's out of warranty), but only if the adapter is demonstrably faulty. For this specific problem, an authorized service center is always a better choice than an independent.

Duo Battery Contacts If a Duo with a good battery shuts down (not sleeps) unexpectedly, won't start from the battery, won't charge the battery, or turns off intermittently, the battery contacts need to be realigned. Apple makes a special tool for this process, which requires opening the Duo. You should ask for the realignment whenever you have your Duo serviced. Battery contacts on other Power-Book models have much better designs.

All PowerBooks except the Power-Book 100 have a backup battery on the motherboard. Apple says that battery should last the life of the PowerBook; Apple has not seen any failures yet. (Back-

up batteries for the 100 are standard lithium cells available from many stores.)

Disk Drives A defective hard or floppy drive must usually be replaced, since neither can be repaired practically. You can sometimes isolate a misaligned floppy drive by keeping careful records of which drive has written on specific disks. The best way to test alignment is by using Accurite Technologies' MacDrive Probe (408/433-1980). It measures the alignment accuracy of a drive, unlike competing programs, which report only good or bad (a moderately misaligned drive will test as good). The program runs only on 68030 Macs: 100-series PowerBooks and Duos from the 210 through the 270c. Unless you manage many PowerBooks, the \$149 price for MacDrive Probe may be too high; for \$235 you can get a new drive installed. Incidentally, the Power-Book floppy drives are extremely difficult to realign.

Hard drive problems can sometimes be cured by reseating or replacing the cable. Otherwise, hard drives should be replaced rather than repaired. Many companies can do data recovery from balky or damaged hard drives; see the ads at the back of this magazine.

System Software Problems Apple says the only incompatibility among its system software products is with Power-Book File Assistant 1.0, which should be upgraded to the current version, 1.1.

#### **Extended Warranties**

AppleCare is an extended-warranty program for Apple products; you pay about 10 percent of the purchase price per year. Is AppleCare worth the cost? Probably not. Extended warranties are essentially insurance policies. The chances that you will need the extended warranty are pretty low, so you will almost always be better off taking your chances. Besides, AppleCare covers only repairs for defects, not accidental damage or loss through theft or natural disasters. SafeWare (614/ 262-0559, 800/848-3469) sells a Fix-It policy that includes both repairs and loss from theft or accident for 7 percent of the replacement cost per year, with a \$50 deductible. (For theft and accidents only, SafeWare offers a \$69 annual policy that pays up to \$5000, also with a \$50 deductible; a rider on your business or house insurance policy may be cheaper still.) Better yet, you may already have an automatic extended warranty-if your Power-Book was purchased with one of the credit cards that offers such warranties. m

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column.

# Your first stop on the Information Highway should be a place you can call home.

#### You already know how to get around.

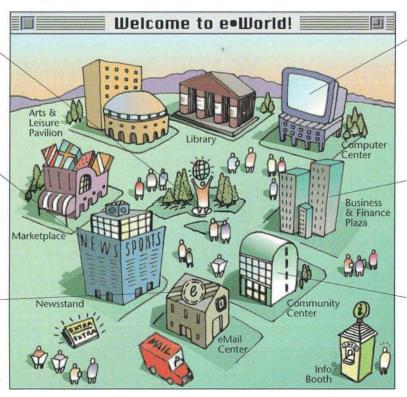
Apple's simple graphic interface makes it easy to find information and navigate around eWorld.

#### All the news you want on your virtual doorstep.

eWorld offers up-to-the-minute news (even the latest sports scores) from wire services, newspapers and magazines from around the world.

#### The postman works all day, every day.

It's a snap to send electronic mail to users of eWorld and other electronic services, including the Internet.



#### **Macintosh®** support in your own backyard.

eWorld is your direct connection to support information from Apple and other software and hardware companies.

#### The experts live next door.

Business, financial and management insights are at your fingertips.

#### You'll want to meet your neighbors.

eWorld is a global community of thoughtful, respectful and inquisitive people who want to hear from you!

#### Check out your new neighborhood. Send for your e-World for Macintosh Starter Kit and try ten hours free.

If you think navigating the Information Highway has to be confusing, you haven't spent time on eWorld, the on-line service from Apple.

eWorld is a totally different kind of on-line service. You feel at home right away, because eWorld was designed from the start to be easy to use. Information is organized intelligently, graphically and simply, so you can get to what you want quickly-without being overwhelmed. You also

have access to great on-line support from Apple and other software and hardware companies. And the eWorld community is downright neighborly, with respectful, relevant and thoughtful on-line conversation.

eWorld is bustling with information for everyone's tastes: from educational activities for kids to tips for graphic designers to the latest from Hollywood and the sports world. But instead of telling you, we think you'd prefer to see for yourself. So send for your free eWorld Starter Kit, including software and special registration information everything you need to sign on right away.

After that, I will get 4 hours free when I pay each monthly fee.

Company Name

23MW495 Check one: 14MB Disk 800K Disk

Yes. I'd like to explore eWorld for Macintosh. Please send me the free

Starter Kit plus 10 hours free on-line. If I decide to subscribe, my first monthly fee of \$8.95 will be waived.

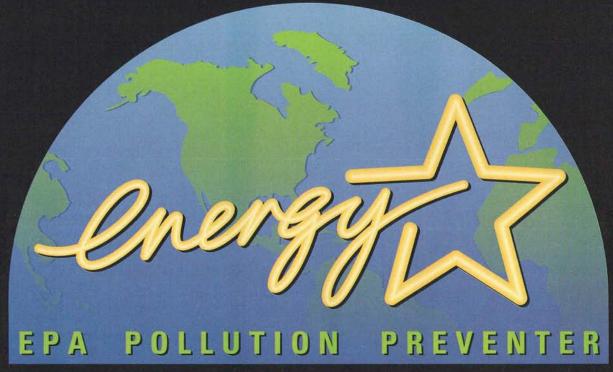
 Check here if you'd like to receive information about eWorld for Windows" as it becomes available.

Return this coupon to: eWorld Starter Kit Apple Computer, Inc. P.O. Box 4493 Bridgeton, MO 63044-9718



© 1995 Apple Computer, inc. All rights reserved. Apple, the Apple logo and Macintosh are registered trademarks of Apple Computer, inc. Windows is a trademark of Microsoft Corporation. Offer includes ten free bours and the first monthly fee of \$8.95 is waived. Your ten free bours must be used within 30 days after you subscribe. Additional time is \$2.95 per bour based on minutes used. Your monthly fee of \$8.95 includes four free bours. Offer veilal in the U.S. and Canada. Access from outside the U.S. and Canada is subject to an international surcharge of \$7.95 per bour. Offer expires 6/15/95 and is subject to change without notice. Coupon must be postmarked not later than 6/15/95. Apple is not responsible for lost, lad, or misdirected mail. Please allow 4-6 weeks for delivery. Note: To enter eWorld, you'll need the free eWorld software, an Apple Macintosh computer with system software version 6.0.7 or later and at least 4 megabytes of RAM, a phone line, and a Hayes compatible modem.

# Pollution Solution.



This symbol identifies energy-efficient computers that save you money and reduce air pollution by "powering down" when not in use.

Over 2000 computers, monitors and printers have earned the right to bear the Environmental Protection Agency's Energy Star<sup>SM</sup> logo. These computers are so smart, they go to sleep when not in use and wake up with a simple touch of the keyboard or mouse. Energy Star<sup>SM</sup> Computers don't cost

any extra, will save money on your energy bill, and prevent pollution from electricity generation. Be part of the solution and look for this logo when you make your next computer purchase. To receive a list of available products call the Energy Star<sup>SM</sup> Hotline at 202 775-6650.



Buy It And Save.

# Only one company could take all there is to know about global technology markets and put it in this convenient kit.

The IDG Global Marketing Kit provides technology market profiles of countries in four regions (North America, Europe, Asia/Pacific, and Latin America). This detailed information is available both in bound collections and on a searchable

CD-ROM (which also contains abstracts of IDC worldwide research, as well as in-depth profiles of IDG publications read all over the world). Also included is an informational video featuring interviews with key industry leaders.

Historically, targeting the right customers throughout the world has required an uncanny combination of experience, timing, money, and luck.

We at IDG, however, believe there is a better way.

One you can use to your

advantage right now. You see, when it comes to experi-

ence in the global technology market, no other company compares with IDG. Today, we have more than 200 publications in more than 60 countries—plus research facilities

and capabilities that are the envy of the industry.

And now, we've taken that breadth of experience and knowledge and packaged it into a comprehensive global technology marketing kit designed to do one thing: make your global marketing efforts easier and more effective.

The kit is only \$495 and is available for immediate delivery.

Call 1-800-IDG-IS IT and order yours today. IDG. It's in a world of its own.



INFOCANADA

CIG

NETWORK WORLD

PC WORLD

PUBLISH



# CONNECTION CONNECTION LEW TECH-NOLOGY

**APRIL 5TH AND 6TH** 

MIAMI BEACH CONVENTION CENTER

#### IT SHOWCASE

OPEN COMPUTING NETWORK COMPUTING WINDOWS ACCOUNTING
NOTEBOOK COMPUTING
HOME OFFICE

#### **DIGITAL PREPRESS/PRINTING SHOWCASE**

Information Technology for Corporate Management and

Marketing. Don't miss the complete show guide in the

Sunday, April 2 issue of The Miami Herald/elNuevo Herald.

DESKTOP PUBLISHING GRAPHIC DESIGN ELECTRONIC PREPRESS MULTIMEDIA PRINTING BINDERY

SPONSORED BY

482 CES HB

The Miami Herald el Herald

PRESENTED IN PART BY

**SPECIAL MANUFACTURER PAVILIONS** 

. Apple Computer, Inc.

A SOLUTIONS

Microsoft

KEYNOTE SPEAKER:

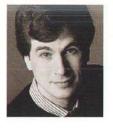
Rohan Champion Vice President, Novell

ADMISSION AT THE DOOR \$15/PERSON FOR INFORMATION CALL 612.894.8007 SHOW HOURS 10 AM - 6 PM DAILY

T H E T H I R D A N N U A L

# STRICTEBUSINESS

COMPUTER & GRAPHICS EXPO



BY DAVID POGUE

# El Cheapo Multimedia

Lights, camera, action—as shareware

ISTEN, WHEN I WAS YOUR AGE, we didn't have CD-ROM. We didn't have QuickTime movies. We didn't have self-running slide shows with thundering sound tracks. We had text files, and we were happy.

But Apple, much ridiculed when it first began hyping multimedia as the Next Big Thing, turns out to have been right. Today, even the feeblest computer Apple sells can crunch video as easily as numbers. And CD-ROM is so popular that you can't show your face at a cocktail party without knowing what Myst is.

Perhaps the biggest clue that multimedia has hit the mainstream, though, is that hundreds of sound, graphics, and video programs have appeared as shareware. When you can get a \$15 shareware program that duplicates the features of some \$400 or \$800 commercial software, you know multimedia has arrived. Here are the best of the penny-pinching alternatives. (Unless otherwise noted, all are available only by modem, not by mail.)

#### Peter's Player 1.1

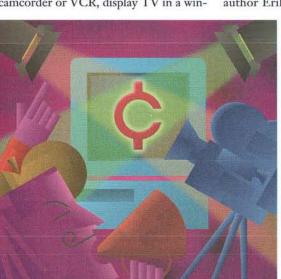
Want to sample the world of QuickTime digital movies without spending much? Download this polished, simple movie player. For playing QuickTime movies, it's far superior to Apple's own Movie-Player. For example, Peter's Player has the good sense to hide such distracting screen elements as the menu bar, the standard QuickTime scroll bar, and even the rest of your desktop (by blacking it out) when playing back your movies. In short, it turns your screen into a big black frame and makes your private screenings dramatic. If you have a Power Mac, it's accelerated, too. One caveat: Peter's Player is for playback, not editing. If you want to copy and paste, read on. (Available online, or send a disk and \$20 to Peter Lee, 39 Canton Ave., Amherst, MA 01002.)

#### MoviePlay 2.0

It's a nearly perfect clone of Apple's MoviePlayer, and it's nearly perfect. MoviePlay's big bonus is the Copy and Paste commands; you can rearrange scenes exactly as you can with Movie-Player. Actually, the bigger bonus is that Movie-Play is free online. (From Motion Works, the Cameraman people.)

#### MovieTrilogy 1.1.1

The name is a charming misnomer; MovieTrilogy is a suite of *five* programs. (1) DeskTopMovie is a fascinating movie player, capable of slow and fast motion, speaking any text track (on speech-ready Macs), adding (or recording new) sound tracks to existing movies, and more. (2) DeskTopText makes scrolling-credit QuickTime clips (alas, not smoothly; but see below). (3) DeskTopTV is for AV-model Macs only (so I didn't test it). But it's supposed to record video from your camcorder or VCR, display TV in a win-



dow, let you add subtitles, and so on. (4) ScreenMovie records a movie of what you're doing on the Mac screen—including your spoken narration, if you have a microphone. The bigger the screen, the jerkier the playback, so you may need a high-horsepower Mac to make this practical. But for training and demos, it's the greatest. (5) QuickMovie, described later. The last two programs are separate downloads but considered part of the trilogy.

These programs don't show the standard QuickTime scroll bar, so navigation is a little awkward. And there's no manual (yet, says author Paul C. H. Ho). But these modules do things no other programs can do. (Available online; send \$30 shareware fee—or for disk send \$40 to P.O. Box 87042, Village Square Postal Outlet, 2942 Finch Ave. E, Scarborough, Ont., M1W 2T0 Canada.)

#### CreditMaker 0.86

This free one-trick pony creates scrolling credits. Type up text in a text file, choose a font, specify the scrolling speed, and save. It's done: a new QuickTime movie file is on your disk, ready for adding to your other movies. There's no way to vary the text styling from line to line, but for "a little hack I wrote one night when I should've been studying for finals" (as author Erik Walter calls it), it's darned

useful. Available online only.

#### QuickTime 2.0 and QuickMovie 1.0b2

The world hasn't made nearly enough fuss about the latest astonishing release of QuickTime from Apple. Yeah, yeah, it makes your movies play twice as smoothly; whatever. But the real news is the music.

You see, QuickTime 2.0 has an accompanying file called QuickTime Musical Instruments (see "Making Music with QuickTime 2.0"). This extension contains 30 instrument sounds from a Roland synthesizer. You can create orchestrat-

ed music, completely forgetting that the previous Macintosh sound limit was four notes at a time in a cheesy Casioorgan sound.

Start with a MIDI file, available by the thousand on America Online and elsewhere (or record your own, if you're a MIDI jock). Using the Get Info command within Apple's MoviePlayer, you can assign each of the MIDI file's tracks to one of the 30 instrument sounds. The result is a QuickTime movie, with video continues

or not, that plays amazing, rich, realistic instrumental music. And it doesn't take up much room on the disk, as a digitized Mac-mike recording would.

So you don't *have* Apple's MoviePlayer? Use QuickMovie, part of the abovementioned MovieTrilogy. It has the same MIDI-track-to-instrument feature in a much simpler format. Just choose the MIDI Arrangement command, and you're in business. The music business.

#### SoundEffects 0.9

This Italian import, Alberto Ricci's SoundEffects (\$15 requested), is a sonic Cuisinart—a sharp-looking, flexible work-alike of Macromedia's \$249 Sound-Edit Pro. It displays the sounds you've recorded (using a MacRecorder or a Mac microphone) as sound waves, which you can cut, copy, and paste. You can add as many parallel channels of sound as you want, and they all play back together. Trust me: you don't know how much fun the Mac can be until you try recording duets and quartets with yourself.

With a name like SoundEffects there'd better be some FX, and there's a whole menu of 'em. You can amplify, echo, filter, fade out, play backward or—my personal fave—turn your voice into a hollow-sounding robotic monotone. Oh, about that version number: it's 0.9 because Undo doesn't work. Oh well.

#### LinksWare 3.0.4

OK then, you've recorded your sounds, scanned your photos, edited your movies. Now what?

LinksWare, that's what. It's an authoring system—a program that serves as Mission Control for all your multimedia snippets. Click one spot, and a picture appears. Click another spot, see a movie. Click over here, and a window full of text appears.

For comparison, the authoring system Macromedia Director goes for \$1195. It's a silly comparison; Director has a hundred times more features than LinksWare. But Director is also a thousand times more complicated. In LinksWare, here's how you create an interactive presentation. Design a home-base screen: a dazzling Photoshop image, say, with buttons you've painted on. Then, in LinksWare, you drag across each area of that painting you want to be a button. Immediately you're shown an Open File dialog box, and you select the document-a picture, movie, sound, even a word processor document-you'd like to appear when that button is clicked. That's it: instant interactivity.

It gets better. The documents that appear when you click on a button may themselves have linked buttons, which can call up other documents—you can create a World Wide Web on your own hard drive. It's hypertext, hypergraphics,



**Links Where?** The world of LinksWare: Click on a phrase—and a picture, article, sound, or movie happens. For added user-friendliness, the trigger words have been set in boldface.

hypereverything. Plus, words or even phrases in a word processor document can serve as buttons. (The included XTND extensions let LinksWare read files from Word, ClarisWorks, and so on.)

LinksWare is so cool that I had difficulty believing it wasn't a commercial program. Surprise: It is, more or less. A four-link demo version is available online; call programmer Tracy Valleau (408/372-4155) and promise to send \$49, and he'll give you a code that turns your version into the full-fledged one temporarily. When you pay, you'll get a code that gives you the full version permanently.

#### PICTShow 2.2

If a multibutton, multimediac LinksWare experience is overkill, consider a simple multimedia slide show. You hand PICT-Show a folder full of QuickTime movies, sounds, and PICT and GIF files. Specify the order. Tell it whether you want to click the mouse to advance "slides" or have the program do it automatically.

Then click on the Show button. The screen darkens, your first movie or picture fades in, and the crowd is in the palm of your hand. It's like Microsoft Power-Point, give or take \$400. PictShow is your versatile, polished ticket to quick, inexpensive presentations. And author Oliver Dreer, Swiss gentleman that he is, asks for naught but a postcard in return.

#### The Upshot

If there's even one recessive creative gene in your body, almost nothing is more fun than twisting your own voice, music, and home movies into personal works of art using these programs. Especially when you got them free (or supercheap). All of these programs are in the Macworld areas of America Online and eWorld. Download, digitize, enjoy. m

Contributing editor DAVID POGUE wrote Macs for Dummies, now in its third edition (IDG Books Worldwide, 1995). He just ended ten years of the ultimate multimedia experience: living in New York City.

#### MAKING MUSIC WITH QUICKTIME 2.0

o get terrific sound tracks without clogging your hard drive with digitized sounds, you need QuickTime 2.0, as described in this column. But where do you get QuickTime and its Musical Instruments? Apple doesn't make them available to the public, except as part of System 7.5 (and even then, only the CD-ROM edition includes Musical Instruments—not the floppy disks). So how do you get these files?

Well, various books and software programs include it. The least expensive is Christmas Lights, a merry little \$19.95 program from Atticus Software Corporation (203/348-6100), which even includes Musical Instruments.

But if you have a modem and America Online, you can get QuickTime 2.0 for no more than the cost of some downloading time. You'll have to take a lot of user-unfriendly steps, but you'll wind up with a genuine, legitimate copy of QuickTime 2.0 (and its accompanying PowerPC and Musical Instruments extensions). Here's how.

- 1. From AOL's Go To menu, choose Keyword.
- 2. Type rasterops. Press the return key.
- Double-click on the Software Library icon. Download the file called Video Installer 3.0. It takes 30 minutes at 14.4 Kbps (about \$1.50 in connection time).
- 4. Double-click on the resulting .sea file; save it onto your desktop. You wind up with three files known as disk images. To turn these files into actual floppy disks, you need yet another program—a disk-image utility, such as DiskCopy, Mount-Image, or Mungelmage. All three are also on America Online; use the keyword quickfinder, type DiskCopy (or whatever), and press return.
- Once you've finally converted those images into actual floppy disks, you'll find the three QuickTime components in folders called Apple extensions.

The world of MIDI music is now open to you—no synthesizer required.



## The Palmtop Blues

Of Newton and Magic Link, Marco and Envoy

HEY'LL BREAK YOUR HEART every time. PDAs. You want them to work. You want them to be lightweight, easy to read, and capable of accepting simple input. You want them to be able to handle your schedule, store your phone numbers, and make your appointments—all while coordinating these details with that mother-ship computer on your desktop. You want them to be able to handle your mail, all of it. You want them to do what they do, without wires.

But the Rolling Stones had it right, in their 1968 paean to personal digital assistants: you can't always get what you want. If we were prone to accept this truism and wait until the millennium for PDAs to fulfill their promises, the case would be closed. But we keep hoping that, somehow, the current Newtons and Magic Links of the world might give us what we need. Right now. Our hearts flutter as we hear the promises, and again as we grasp a sleek new device in our sweaty little palms. And for a moment, we are bowled over. After all, these are marvels of technology, miracles of silicon, C code, and sweat. Look what they do!

And then we try to use them. And find they do not do things well enough. PDAs will always break your heart.

#### **Newton Redux**

Are PDAs useless? No, not at all. If it were so, Newton would be dead by now, and the rumors of its death have been exaggerated, if not greatly. To the surprise of observers who expected the executive chop squad now running Apple Computer to summarily ditch the Newton, Apple is not only supporting its illlaunched device but has also introduced a new version, the MessagePad 120. This is the third iteration, following the hasty fixes that made the MessagePad 110 marginally superior to the first issue, the 100. The changes run from the cosmetic (an improved lid to cover the screen) to the substantial (a desperately needed boost in RAM, up to 2MB). At \$699, the sticker price is still high, but one can find

the first model, the slickest trash around, for as low as \$200.

But the best news is in software. Now that the Newton is approaching the ripe old age of two (and considering the ridicule that came from "Sculley's folly," this is an achievement in itself), it finally boasts a reasonable number of third-party applications. My favorite used to be a program called Fingertip for Stats (Fingertip Technologies), which accessed the daily performances of various baseball players, but for obvious reasons you don't hear much about that one these days.

While some of these applications are directed to the consumers who were supposedly the original audience for the Newton, Apple has successfully cajoled some big companies into developing vertical applications for the palmtop. Among



those developers are Brigham & Women's Hospital, Standard & Poor's, and the Voice of America. The key to making a good specialized Newton application, of course, is eliminating the occasions where handwriting input is required. (In many cases this can be done through the use of a series of screens that allow you to check things off rather than actually create text.)

Still, using a Newton almost always requires that at some point you have to get text into the box. As handwriting recognition goes, the Newton does quite a good job—better and better with every version. But this is like saying that a plane almost made it to its destination. Every time I use the Newton I am impressed that it makes even the slightest sense of my scrawl. But when I am less focused on the contemplation of technological tricks and more concerned with doing work—even entering an address or a short note—I find that the Newton becomes a frustrating parlor game, twisting my input into improbable misinterpretations. It breaks my heart.

Now, Palm Computing, maker of a Newton program called Graffiti, asserts that its product will allow you to flawlessly input text into the device. But Graffiti requires you to alter the way you print, writing some letters in weird, neo-hiero-

> glyphic fashion. In other words, change the way you write. Sorry. I have a nearreligious belief that machines should adjust themselves to my behavior and not the other way around. I think that sooner or later, the Newton's designers are going to have to figure out another way for it to accept input. Only then will people be able to appreciate the elegance of its interface and the sound thought behind its operating system.

#### Magic at Last?

Newton's biggest competitor is the Sony Magic Link,

the system created by a company called General Magic. There is sort of a soap opera back-story here, in that Apple's Newton team was led by Steve Capps, one of the original Mac team, while the rival General Magic development team was headed by charter Mac wizards Andy Hertzfeld and Bill Atkinson. There are several striking differences between a Magic Link and a Newton. There are also many similarities: both have clocks, calendars, and phone lists. Both have continues



infuriatingly dim screens. Both cost too much. But at \$995 for a basic unit, and almost \$1500 for a loaded system, the Magic Link costs more.

The Magic Link is bulkier than the Newton, but I like it better. It is more centrally based on communications and boasts an underlying technology called Telescript. When you get a Magic Link you are automatically signed up in an AT&T service called PersonalLink. (It costs only \$10 a month, something of a bargain.) By communicating with the service, you can send a message to someone on any electronic service or even by fax. And Telescript allows "intelligent" messages. Among other things, that means you can send mail to people under certain conditions, or use software agents to seek out replies to queries. (For more on Telescript, see my column about General Magic, August 1993.)

The Magic Link interface, called Magic Cap, is busier than Newton's-it relies much more on icons, and it provides an unprecedented degree of whimsy. For instance, on the main screen, which depicts a virtual office, I have installed an animation of several dolphins diving into my desk. While not functional, it is endearing. Magic Cap has caught some flak from folks who charge that it is too game-like (although compared with Microsoft's Bob interface for home users, it's more formal than a spreadsheet), but that very quality makes the Sony device quite easy to use.

But the best part of the Magic Link is what it doesn't try to do: read your handwriting. Instead, you input text with a little on-screen typewriter-style keyboard. (Or you can connect an optional full-size keyboard, which rather defeats the purpose of a palmtop device.) Two-finger typing is surprisingly accurate, though I still make about one mistake every line or so. But while making an error on the Newton almost always requires me to scratch out the entry and start over, at least I can fix my Magic Link input with the delete key-much easier.

For a while I carried around my Sony every day, kept my calendar on it, sent messages to people with it. Then I used it more rarely. Why? For one thing, it is difficult to coordinate its information with the data on my desktop machine. For some reason, a Macintosh version of the Magic Cap interface has yet to appear. Keeping two calendars and two phone books is a messy situation. And when I go on trips, I feel like a jerk when I wind up packing both my PowerBook and my Magic Link. It's as if someone has pinned a sign on me: "Early Adopter and Slave to Technology."

#### Link Me

All of this would be forgivable if the Magic Link were really linked. But it isn't. You have to plug it into a phone line, using the Link's crummy 2400-bps modem. What you really need is a wireless version. That's what we want from PDAs—the ability to receive messages from anywhere and send back replies, right? I am convinced that personal digital assistants will forever and continually break my heart until they are all completely wireless.

So imagine my delight in January, when the Motorola company introduced not only a General Magic device called Envoy but also a Newton device called Marco-both hooked up for wireless communications using a combination of the Ardis wireless system and the Radio-Mail communications system.

Machines should adjust themselves to my behavior and not the other way around

I haven't had time yet to play with loaner versions of the Envoy or the Marco. But at the recent Macworld Expo, I did have a chance to handle them. Both are somewhat bulkier than the nonwireless alternatives-wireless modems and multiple batteries make these worthy of the name palmtop only if you are talking about trees instead of hands. Both cost more than their wired counterparts. Still, they are sufficiently compact to stuff in a briefcase.

I took advantage of the opportunity to send myself some electronic mail. With the Envoy, I sent myself a list of the costs of various RadioMail subscription plans. The message arrived safely at my Internet provider, and I figured that to satisfy my (admittedly heavy) needs in handling mail, the device would cost me hundreds of dollars a month, landing me just this side of the poorhouse.

With the Marco, I input the following note: "This is a Marco message." When I got home, the Newtonesque translation was waiting for me: This i5 a marco missile.

Broke my heart. m

Steven Levy's latest book is Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything (Viking, 1994). Levy is a Fellow of the Freedom Forum Media Studies Center in New York.

#### CONSPICUOUS CONSUMER

BY DEBORAH BRANSCUM



# The Buying Game

A true tale of technolust and commerce

VER A 90-DAY PERIOD LAST autumn, I bought three new Macintosh systems: one for home, one for my office, and one for a friend. No particular meaning should be read into my experiences, because a single case isn't necessarily representative of the treatment a given vendor gives all its customers. Your experiences may vary wildly. Nevertheless, the mistakes I made and the lessons I learned may help you with future purchases.

#### **Retail Fun**

Sometimes you want a new computer instantly. To wait is unthinkable. This was not my state of mind when we went out shopping, but my husband had the glazed look of a true believer. I bet he'd have given a stranger every dime in our bank account for a Quadra 630. So I

stepped in to negotiate.

After searching ads in our local Computer Currents, we went to an Apple-specific dealer in San Francisco, Computer-Ware, to check its inventory and prices. The store had most of what we wanted. Moreover, we found the company willing when asked to match prices advertised by competitors. We had to show documentation, in the form of an ad, and there was no mixing and matching-we couldn't get the lowest price on a computer from one competitor and the lowest price on a printer from another competitor. Thanks to ComputerWare's unwritten policy, we didn't have to drive out of town to get a good price on the Macintosh itself.

Still, there were problems. For example, only three monitors were on display at the store, none of which was the one we wanted, so we couldn't compare it with others. Also, ComputerWare didn't have the brackets needed to install an internal CD-ROM drive. This was in September. In October we bought an external drive. In late November ComputerWare finally received brackets from Apple, which says it underestimated demand. No kidding.

Another problem was that ComputerWare mistakenly canceled our order for

the Apple Video/TV System board when we canceled our order for an internal CD-ROM drive. Neither was available on the day we bought the computer. As a result, weeks dragged by needlessly without the dazzling benefit of football or game shows to enliven our Macintosh use.

Still, I liked ComputerWare, which has won plaudits from a local consumer publication for value and service. With luck, the computer chains of the world won't put all independents like ComputerWare out of business.

#### **Discount Hell**

Retailers sometimes moan that customers don't care whether the stores stay in business or not—all they care about is price, price, price. It's true; when I was buying a Power Macintosh 7100 for my business,

I wanted the least expensive system on the planet available from an authorized dealer. And available now. So I hauled myself down the San Francisco Peninsula to Palo Alto, and to Fry's, a Silicon Valley legend.

Fry's is a small chain of stores that's made to order for employees of the high-tech industry. Its merchandise ranges from cola and candy to trashy paperbacks to DIP switches to complete computer systems and aisles and aisles of software, all aligned neatly within a warehouse decorated in a Western motif.

On the phone, a saleswoman at this technological-assault-on-the-senses gave me the lowest total price for the 6100 and Apple Personal LaserWriter 320 I wanted. So the trek seemed worthwhile, though when I got there I couldn't find a salesperson who knew anything about monitor emissions.

A salesman I did find got impatient when asked to open a box to show me a display. Then there was an interminable wait to pay and then pick up the system while indifferent or beleaguered staff looked on. (Luckily, Fry's sells magazines, so I was able to distract myself from leaping over the will-call desk to throttle the so-called help.)

Maybe it was a day from hell for the store as well—a staffer claimed many

employees had quit the evening before. I have no idea if that's true; I do know that I wouldn't go back to Fry's to buy anything that might require service, because simply buying the computer was such a chore. For a toaster or junk food Fry's might be just the ticket, but I'll pass on it for future hardware purchases.

#### Mail-Order Maybe

A friend who lives abroad asked for my help in buying a Mac. So, armed with her simple request for a Performa 475 with 8MB of RAM and a StyleWriter II, I called around and compared price quotes from

several places. Out-of-state mail order was attractive because out-of-state operations don't usually charge sales tax. (Note that many states are becoming aggressive about sales tax, though. Even if the reseller doesn't collect sales tax, the state can go directly to the consumer for it.)

J&R ComputerWorld in New York had the lowest prices I found in my brief survey and is an authorized Apple dealer. So I called back to place my order—and continues



The fast, affordable way to run DOS and Windows™ on your Macintosh® computer

Reply's DOS on Mac card:

- Runs DOS and Windows at true 486 speed—not through software emulation
- Turns your Mac into a powerful dualmicroprocessor system
- Uses Mac peripherals—even shares your Mac's memory
- Offers optional networking software for NetWare and TCP/IP compatibility
- Offers optional Sound Blaster<sup>™</sup> SB16 for PC multimedia compatibility
- Prices start at \$495



Reply Corporation, DOS on Mac, and the Reply logo are trademarks of Reply Corporation, Macintosh is a registered trademark of Apple Computer. All other product names referenced herein are trademarks of their respective companies. Reply Corporation Phone: 408-942-4604 Fax 408-956-2783. requested an additional discount. "It's the end of the month," I whined, hoping the salesman had a quota to meet, "and my friend really needs to save money. Since she's buying both a computer and printer, is there anything else you can do for her?" Surprisingly, the salesman said yes and lopped off another \$40.

The salesman at J&R was fast and friendly, but the system arrived late. Another friend used J&R to order a Performa as a Christmas present, but it didn't arrive. He called J&R and discovered that the promised Mac wouldn't be available until January, despite what he had been told when ordering. So my friend canceled the order and went elsewhere.

At the time I placed my friend's order, Performas were available by mail only through Apple dealers who also had retail storefront businesses (see *Conspicuous Consumer*, November 1994, for a list). Consumers now have more options, since Apple has given "limited pilot approval" for selling Performas to the top three Mac mail-order catalogers—MacWarehouse, MacConnection, and The Mac Zone—as well as Mac's Place and Tiger, which have been selling PowerBooks and Apple peripherals for some time.

#### **Lessons Learned**

By now a scarred veteran of the buying game, I've learned some tips that may make your shopping sprees easier.

• Know what you want and, if you can, buy everything you need at one time. ClarisWorks, for example, was priced at \$70 as part of a system but cost as much as \$129 alone when I made my purchase. Peripherals and software often have different profit margins than computers; buying them together gives you greater leverage in negotiating for a discount.

Comparison shop by fax. Two
weeks went by before all the dealers I surveyed responded to my fax, but it was
great to get price quotes in black and
white. Interestingly, one store faxed me
twice—with different prices. When I
inquired, I was told the lower estimate
was a "corporate discount." Ask loudly
for a corporate or business discount
should one apply to your purchase.

• Do your homework. There may be special promotions available—or the hardware you want may be nearing the end of its life span. For example, the NEC MultiSync 5FGe monitor I bought is no longer manufactured. Model turnover is very fast in this industry; prices are at their peak when a model is brand-new and tend to drop sharply toward the end of the cycle. Ditto for Mac systems, of course, and other equipment. Had I thought to call NEC before shopping, I could have

negotiated a better price or waited for inventory-clearance sales.

• Ask dealers to match prices. The best price I found on a US Robotics Mac & Fax Sportster 14.4 modem was \$158. But the mail-order company offering that price had a significant shipping fee and an iffy track record. So I called MacWarehouse and asked a saleswoman if she could match that price. It was only a \$3 difference, but I also saved on shipping and got my package the next day. (MacWarehouse cautions that it is not company policy to match competitors' prices.)

 Be flexible. Home versions of Apple's business machines are often a bargain. I bought a Power Macintosh 6100 because I needed a computer immediately. As it happens, it would have been less expensive to wait for a Performa version of the Power Mac—assuming I found a 14-inch display acceptable.

#### The Store I Hate

Occasionally I stop at a nearby Comp-USA to browse, but I wouldn't buy anything there. Why not? Well, one day I went to check out a monitor. While there, I noticed there was no copy of FileMaker Pro in the limited space devoted to Macintosh software. I asked a clerk nicely if he could find it for me. He assured me that if I couldn't find it neither could he. When I expressed surprise that Comp-USA didn't carry FileMaker, one of the best-selling applications for the Mac, the clerk checked it for me on the store computer. At least he tried, but the computer listed only the Windows versions of File-Maker, not the Mac version, and so he couldn't give me any information. What else? This store was selling version 1.0 of Arrange from Common Knowledge. Version 2.0 had been out since August, and by this time it was November. Duh.

Now, it's unfair to suggest that the Mac-hostile atmosphere, lukewarm response, and pathetic selection I experienced at a single store are necessarily representative of the chain as a whole. Please check out the situation for Mac owners at your local store and come to your own conclusion. And in the meantime, happy hunting—there's a Mac bargain just waiting for you.

You can write to contributing editor DEBORAH BRANSCUM, *Macworld's* Conspicuous Consumer, at *Macworld*, 501 Second St., San Francisco, CA 94107, or via the Internet (branscum@aol.com).

Send nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107, or via the Internet (branscum@aol.com). Also, drop Conspicuous Consumer a line if a company is ignoring you.



# Editors' Choice

#### THE BEST PRODUCTS FEATURED IN MACWORLD

#### Edited by Elizabeth Maffly

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in Macworld's comparative articles. A next to a product indicates that we chose more than one product in that category. A next to a product listing indicates that a native Power Mac version is available.

#### Hardware

#### MONITORS

#### SMALL COLOR MONITORS, Jan 94

**14-inch display:** Sony CPD 1430; Sony Corp. of America, 800/222-7669; \$779.95.

♦ Nanao FlexScan F340i•W; Nanao USA, 800/800-5202; \$799.

**15-inch display:** NEC MultiSync 4FGe; NEC Technologies, 708/860-9500; estimated street price \$755.

#### TWO-PAGE COLOR MONITORS, Nov 94

PressView 21 Display System; SuperMac Technology, 408/541-6100; \$3999.

#### NETWORK HARDWARE

#### REMOTE-ACCESS SERVERS, Oct 94

Mixed networks: NetConnect Remote Access Server; Asanté Technologies, 408/435-8401; \$3899 for eight ports. AppleTalk networks: ARA Multiport Server; Apple Computer, 408/996-1010; four ports \$1799, eight ports \$3298

#### PRESENTATION HARDWARE

#### PORTABLE PRESENTERS, Jan 95

Z115; nView, 804/873-1354; \$5495.

#### PRINTERS

#### COLOR PRINTERS, Aug 94

Low-end ink-jet: DeskWriter 560C; Hewlett-Packard, 800/752-0900; \$719.

**Solid ink-jet:** Phaser 300i; Tektronix, 503/682-7377; **\$**9995.

Thermal-wax transfer and color laser: Phaser 220i; Tektronix, 503/682-7377; \$5995.

#### DYE-SUBLIMATION PRINTERS, Jul 94

Prepress proofing—tabloid size/fastest: Phaser 480; Tektronix, 503/682-7377; \$14,995.

#### Prepress proofing—tabloid size/most complete:

Rainbow; 3M, 612/733-1110; estimated street price of \$20,000.

Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; \$7999.

General publishing and business: Phaser IISDX; Tektronix, 503/682-7377; \$9995.

#### PERSONAL PRINTERS, Sep 94

Ink-Jet: DeskWriter 520; Hewlett-Packard, 800/752-0900; \$365.

**Laser—\$1000 to \$1600:** microLaser Pro 600; Texas Instruments, 214/995-6611; **\$**1599.

#### WORKGROUP PRINTERS, Feb 94

**High-speed:** Hewlett-Packard 4Si MX; Hewlett-Packard, 800/752-0900; \$5499.

Best buy: Apple LaserWriter Pro 630; Apple Computer, 408/996-1010; \$2529. Hewlett-Packard LaserJet 4M; Hewlett-Packard, 800/752-0900; \$2329.

#### SCANNERS/IMAGE CAPTURE

#### **ELECTRONIC CAMERAS, Sep 94**

Apple QuickTake 100; Apple Computer, 408/996-1010; \$749.

#### HIGH-BIT FLATBED COLOR SCANNERS, Mar 95

- Arcus II; Agfa, 508/658-5600; \$3495.
- PowerLook; Umax, 510/651-8883; \$3495.

#### LOW-COST COLOR SCANNERS, Nov 93

**\$1300 to \$1600:** La Cie Silverscanner II; La Cie, 503/520-9000: \$1599.

Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; \$1599.

Under \$1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; \$1299.

#### OCR, Nov 93

OmniPage Professional; Caere Corp., 408/395-7000; \$995.

#### SYSTEMS/STORAGE

#### 1.3GB OPTICAL STORAGE, Dec 94

**Best low-cost solution:** 1.3Gig MO; Club Mac, 714/768-8130; \$2099.

Best overall performance: Genesis 1300; Microtech, 203/468-6223; \$2899.

#### HIGH-SPEED HARD DRIVES, Aug 93

**2.7GB drives:** ❖ Nova XL 2700; Microtech, 203/468-6223; \$2999. ❖ Vista 3.5GB; Relax, 510/471-6112; \$3499.

SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; \$499.

#### PC COPROCESSING, Oct 94

OrangePC Model 210; Orange Micro, 714/779-2772; \$1283

#### RAID STORAGE SYSTEMS, Apr 95

RAID 3 or 5: MR/5 RAID; MegaDrive Systems, 310/ 247-0006; \$18,840.

RAID 0: SledgeHammer 2000FMF; FWB, 415/474-8055; \$2359.

#### SYSTEM UPGRADES, Feb 95

#### Upgrade for Macintosh Quadra 650, 800, or 950: Power Macintosh Upgrade Card; Apple Computer, 408/996-

Power Macintosh Upgrade Card; Apple Computer, 408/996 1010; \$699.

Upgrade for other 680X0 Macs: Replace with Power Macintosh 6100/60 with CPU booster and cache card. Power Macintosh 6100/60; Apple Computer, 408/996-1010; \$1819 (base system with 8MB of RAM). PowerClip (CPU booster); Newer Technology, 316/685-4904; \$245. 256K cache card; various companies, roughly \$200.

#### VIDEO/DISPLAY

#### 24-BIT VIDEO CARDS, Apr 94

Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; \$599.

Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; \$4499.

#### HIGH-END VIDEO EDITING, Jun 94

Presentation video: ❖ MoviePak2 Pro Suite; Raster-Ops, 801/785-5750; \$4199. ❖ VideoVision Studio; Radius, 408/434-1010; \$4499.

Corporate video (offline): Media Composer 400s; Avid Technology, 508/640-6789; \$14,995.

Corporate video (online): VideoCube; ImMix, 916/ 272-9800; \$40,500.

#### PHOTOSHOP ACCELERATORS, Apr 94

PhotoBooster; Radius, 408/434-1010; \$999.

#### Software

#### ACCOUNTING/FINANCE

#### GROWING A SMALL BUSINESS, Nov 93

Small-business system: M.Y.O.B.; Best Ware, 201/ 586-2200; \$199.

Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; \$119.95.
continues

# MACWORLD Editors' Choice

#### **BUSINESS TOOLS**

#### PORTABLE-DOCUMENT SOFTWARE, Apr 95

**Document Distribution:** Common Ground 1.1; No Hands Software, 415/802-5800: \$189.95.

#### STATISTICS, Oct 93

Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; \$595.

Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; \$895.

#### CD-ROM

#### TOP 10 CD-ROMS, Mar 94

Overall: Seven Days in August; Time Warner Interactive Group, 818/955-9999; \$79.99.

#### COMMUNICATIONS/NETWORKS

#### **COMMUNICATIONS SOFTWARE, Aug 94**

**Basic connectivity:** ZTerm; David P. Alverson (no phone number available); \$30.

**Terminal emulation:** Crosstalk for Macintosh; Digital Communications Associates, 404/442-4000; \$195.

Internet exploration: VersaTerm; Synergy Software, 215/779-0522; \$125.

#### DOS WINDOWS EMULATION, Oct 94

Timbuktu Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Farallon Computing, 510/814-5000;

#### HIGH-SPEED FAX MODEM SOFTWARE, Oct 93

Faxstf; Telefocus, 816/886-9800; \$79.

#### **NETWARE CONNECTIVITY, Sep 93**

NetWare for Macintosh; Novell, 801/429-7000; \$495 for 5-user license to \$2295 for 200-user license.

#### PROTOCOL ANALYZERS, Jul 94

EtherPeek, AG Group, 510/937-7900; \$795.

#### TERMINAL EMULATOR, Oct 93

VersaTerm; Synergy Software, 215/779-0522; \$149.

#### GRAPHICS

#### 3-D MODELING, Dec 94

Stand-alone modeler: formZ; autodessys, 614/488-9777; \$1495.

Entry-level modeler: Infini-D; Specular International, 413/253-3100; \$695.

#### CLIP ART'S GREATEST HITS, Jan 94

Overall collection: ❖ ClickArt Studio Series; T/Maker Company, 415/962-0195; \$99.95 per volume.

- Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; \$67.50 per month.
- Metro ImageBase Electronic Clip Art; Metro Image-Base, 800/525-1552; \$74.95 per volume, CD-ROM

\$149.95. Images with Impact series; 3G Graphics, 800/456-0234; \$99.95 to \$129.95 per volume, CD-ROM \$499. Typographers' Ornaments; Underground Grammarian, 609/589-6477; \$25 per volume; ten TIFF albums \$200; EPS volumes \$50 each.

#### DRAW PROGRAMS (LOW-COST), Sep 93

**Budget draw:** Expert Draw; Expert Software, 305/567-9990; \$49.95.

Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; \$79.

**Beginners' program:** Aldus SuperPaint; Aldus Consumer Division, 619/558-6000; \$149.95.

Overall: Canvas; Deneba Software, 305/596-5644;

#### FONT BUYERS' GUIDE, Mar 94

**Text-face collection:** Type On Call CD-ROM; Adobe Systems, 415/961-4400; \$99 (this price includes the ability to unlock two families from preselected packages); an additional \$25 enables you to unlock individual faces, or \$69 to \$179 for unlocking families.

Display/decorative-face collection: Fontek; Letraset, 201/845-6100; \$39.95 per face.

Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; \$89 for 57 fonts.

#### IMAGE DATABASES, Oct 93

- Aldus Fetch 1.0; Adobe Systems, 206/628-5739; \$295.
- Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; \$249.

#### IMAGE EDITORS, Feb 95

Adobe Photoshop 3.0; Adobe, 415/961-4400; \$895.

#### INTEGRATED SOFTWARE

#### INTEGRATED SOFTWARE, Feb 94

ClarisWorks; Claris Corporation, 408/727-8227; \$299.

#### ONLINE SERVICES

#### ONLINE SERVICES, Aug 94

E-mail: America Online; America Online, 703/893-6288; basic monthly fee \$9.95.

Reference: CompuServe; CompuServe Information Service, 614/457-0802; basic monthly fee \$8,95.

#### ORGANIZATION/PRODUCTIVITY

#### CALENDARS, Jul 93

Alarm system: ♦ First Things First; Visionary Software, 503/246-6200; \$79.95. ♦ Smart Alarms Plus; JAM Software, 203/630-0055; \$75.

Vendors: Please write to Macworld Editors' Choice, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price. All-around scheduler: Now Up-to-Date; Now Software, 503/274-2800: \$99.

Meeting scheduler: Meeting Maker; On Technology, 617/374-1400; five-pack \$495.

#### GRAPHING SOFTWARE, Aug 94

DeltaGraph Pro 3 3.0.4; DeltaPoint, 408/648-4000; \$195.

#### SALES-AUTOMATION SOFTWARE, Oct 93

- Contact Ease; WestWare, 619/274-5053; one user \$395, five users \$1495.
- CBS; Colleague Business Software, 512/345-9964;
   \$495.

#### TEXT-RETRIEVAL SOFTWARE, Dec 93

Small system: On Location; On Technology, 617/374-1400; \$129.

**Multiuser system:** Personal Librarian; Personal Library Software, 301/990-1155; \$995.

#### PRESENTATION TOOLS

#### PRESENTATION SOFTWARE, Jul 94

Persuasion 3.0; Adobe Systems, 206/622-5500; \$495.

#### UTILITIES

#### **BRAVE NEW DOCUMENTS, Jan 94**

Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; \$189.95

**Book-length documents:** FrameReader; Frame Technology, 800/843-7263; \$84.95.

#### PRINTING, Sep 93

PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; \$149.

#### VIRUS KILLERS, Jul 94

Commercial software: Virex; Datawatch, 919/549-0711; \$99.95.

Free software: Disinfectant; free from various online

#### VIRTUAL MEMORY SOFTWARE

#### VIRTUAL MEMORY, Jun 94

Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; \$99.

Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; \$99. ♥

#### WORD PROCESSORS

HIGH-END WORD PROCESSOR (for fast 68040 Macs and Power Macs), Mar 95

Microsoft Word 6.0; Microsoft Corporation, 206/882-8080; \$325.

#### LOW-COST WORD PROCESSOR, Mar 95

MacWrite Pro; Claris Corporation, 408/727-8227; \$99. ♥ m

# Star Ratings

HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

#### **Edited by Wendy Sharp**

Macworld Star Ratings lets you compare Macintosh products by providing summaries of Macworld's authoritative product reviews from the past year. The number of stars indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The symbol indicates that a product is available in a native Power Mac version.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to Macworld Star Ratings, 501
Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

#### Software

#### BUSINESS TOOLS

★★★ 4D First 1.0 (1.0.1), ACI US, 408/252-4444, \$295. This entry-level relational database is a low-cost way to distribute the power of 4D and 4D Server to an office full of Macs. It's not much easier to use, however, than the full-fledged 4D. May 94 €

\*\* AccuZip6 1.8.7, Software Publishers, 800/233-0555, \$689. Bulk-mail software has informative progress indicators, batch and individual processing, low rates, and flexible parsing during import, but the interface is incomprehensible. Sep 94

\*\* Adobe Acrobat 2.0, Adobe Systems, 415/ 961-4400, \$195. The font fidelity of this portable-document software is uneven, and the software demands too much in resources compared with other options. Mar 95

\*\*\* Adobe Acrobat for Workgroups 2.0, Adobe Systems, 415/961-4400, \$1595. As a collaboration tool, this software is relatively inexpensive and offers well-done annotation tools. However, it's resource-intensive, and creating hypertext documents with it isn't easy. Mar 95

\*\* BaseMap 1.0.1, GeoPoint, 415/957-1560,

**\$149.** For simple maps displaying simple data, this mapmaking tool may be useful. It's not for the cartographic sophisticate, however, as it offers very limited data-display abilities and only one projection. May 94

★★ Bulk Mailer CASS 1.00d, Satori Software, 206/443-0765, \$150. Unattended operation is possible with this bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94

\*\* CA-Cricket Graph III 1.52, Computer Associates International, 516/342-5224, \$129.

Graphing software's features are just right for charts in the physical and social sciences, but lack pizzazz. The program is easy to learn and use, and includes math features for data transformations and curve fitting. Dec 94

★★★ ClarisImpact 1.0 (1.0 v3), Claris Corp., 408/727-8227, \$399. Business graphing, project management, object-oriented drawing, word processing, and presentation functions merge in this business graphics software. The outstanding integration offers versatility that dedicated programs are pressed to match. Jun 94 ♥

★★★ ClarisWorks 3.0, Claris Corp., 408/ 727-8227, \$129. Inexpensive, easy to use, and surprisingly powerful integrated software is hands down the best package available. It's far better in terms of features, speed, integration, and use of system resources than its competition. Feb 95 ♥

★★★ Cricket Graph III 1.5 (1.52), Computer Associates International, 516/342-6000, \$129. Basic and foolproof charting program produces clean charts, although its feature set is fairly modest. Apr 94

★★★ Crystal Ball 3.0, Decisioneering, 303/ 449-5177, \$295. Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster-avoidance in a variety of business tasks. Oct 94

★★★ Decision Analysis 2.5, TreeAge, 800/
254-1911, \$379. Decision-assistance software handles complex business cases by constructing tree diagrams of probabilities and payoffs. It offers a type of modeling that is realistic and easy to modify. Nov 94

\*\*\* DeltaGraph Pro 3 (3.5), DeltaPoint, 408/648-4000, \$195. This charting program is the best feature-for-feature value in Macintosh charting. Apr 94 \* Extend+BPR 3.0, Imagine That, 408/365-0305, \$990. Business-modeling software includes superior templates for business-process reengineering, but some programming experience is helpful. Oct 94

\*\*\* FastTrack Schedule 2.1, AEC Software, 703/450-1980, \$279. Simple project-management software is ideal for managers who need to put together a schedule quickly and easily, but if you require more power to manage conflicts, you'll need a more comprehensive program. Sep 94

\*\*\* Helix Express 2.0.1 (2.0.4), Helix Technologies, 708/465-0242, \$589. Icon-based relational-database software's improved performance makes it a serious competitor for all-Mac networks. Especially notable is its much faster speed; multiuser operation is downright snappy. Jul 94

★★★ InfoDepot 2.0, Chena Software, 610/770-1210, \$295. All-in-one program for project planning includes tools for brainstorming and organizing ideas; scheduling project steps; and entering, calculating, and presenting data. It does a good job but has some flaws. Jan 95 ★★★ Map II 1.5, ThinkSpace, 519/858-5047,

\$395. Well-structured program has most of the functions a simple geographical information system needs and is suitable for introductory instruction in GIS and for alert first-time users who just like maps. May 94

\*\*\* MarcoPolo 3.0, Mainstay, 805/484-9400, \$895. Full-featured document-management system is significantly improved. The addition of OCR—both the handling of unrecognized words and the ability to batchprocess TIFF files with OCR—make it a very usable system.

\*\*\* MicMac 2.0v1, Nirvana Research, 408/ 459-9663, \$89. The concept of Mac as dictation machine is undeniably attractive, and Nirvana Research has pulled it off well. It takes lots of hard drive space to save recordings, though. Nov 94

\*\*\* Microsoft Excel 5.0, Microsoft Corp., 206/882-8080, \$339. Although the feature set of this spreadsheet is stunningly rich, the resource requirements are jaw-dropping, including nearly 30MB of hard drive space plus, to run comfortably, 24MB of RAM. Still, it is relentlessly complete. Jan 95

\*\*\* Microsoft FoxPro for Macintosh 2.5
(2.6), Microsoft Corp., 206/882-8080, \$495.
Dazzlingly fast relational database has a greatly improved interface. For projects of 4 to 20 users that handle large amounts of data it offers excellent performance. Apr 94

\*\*\* Microsoft Works 4.0, Microsoft Corp., 206/882-8080, \$99.95. Although this isn't the best integrated package around, it's a sensible, low-cost choice. It offers a respectable word processor, database, spreadsheet, calendar, and address book, as well as a slide-show module, and drawing and communications tools. Jan 95

\*\*\* Pablo 2.0.1 (2.03), Andyne Computing, 613/548-4355, \$695. This effective end-user data-reporting tools puts a considerable workload on the corporate information department, but it sidesteps the hassles of SQL data access and produces great reports with minimal effort. Jul 94

\*\*\* Street Atlas USA 2.0, DeLorme Mapping, 207/865-1234, \$169. For the most part, this geographical information software delivers what it promises at a great price. Although inaccuracies in the data are troubling, DeLorme pledges to fix all reported errors in subsequent annual updates. Oct 94

\*\*\* TeamFlow 3.1, CFM, 617/275-5258, \$295. Total Quality Management flowchart software is a valuable business tool. Its report printing and customizability are limited, however. Nov 94

\*\*\* TopDown 4.0 (4.1), Kaetron Software
Corp., 713/298-1500, \$345. Flowcharting program's
support for custom symbols and automatic drawing aids,
along with its ability to let you easily create and navigate
lower-level charts, make it a productive tool. Jul 94
continues

# **Star Ratings**

\*\*\* ZipZapp 1.0, True Basic, 603/298-8517, \$39.95. You can use this data-reference utility to find an area code, the correct spelling of a city's name, and more. The interface is intuitive, and the cost, low. Oct 94

\*\*\* ZP4 12.1 (14), Semaphore Corp., 408/688-9200, \$125. Inexpensive bulk-mail software supports batch and individual processing, but the progress indicators are uninformative, and unattended operation requires extra work. Sep 94

#### COMMUNICATIONS/NETWORKS

- \*\* AccessPC 3.0, Insignia Solutions, 415/ 694-7600, \$129.95. Utility translates most word-processor and some database formats, but some of its translations result in data loss. Apr 94
- ★ BLAST Professional, BLAST Inc., 919/542-3007, \$139. Our reviewer could not get this telecom software to work reliably and consistently, and found the minimalist and quirky interface frustrating. Jan 95
- \*\*\* Crosstalk for Macintosh 2.0 (2.0.1), Digital Communications Associates, 404/442-4095, \$195. Commendable communications product has a feature set that well matches its competition. Still, the script editing is complex. Apr 94
- \*\*\*
  DOS Mounter Plus 4.0, Dayna Communications, 801/269-7200, \$100. File-transfer and translation utility works with floppies, removable drives, and network volumes. Apr 94
- ★★ The Internet Companion, The Voyager Company, 914/591-5500, \$29.95. Well-written, HyperCard-based electronic book offers less information than others. Internet access is available through accompanying software, but it's a terminal-emulation screen. Dec 94
- \*\*\*
  Internet Explorer Kit and Internet Starter Kit, Hayden Books, 317/581-3500, \$29.95 each. Well-written books and useful software combine to produce one of the best introductions to the Internet available for Mac users. Dec 94
- \*\*\*
  Internet Membership Kit, Ventana Media, 919/942-0220, \$69.95. If you need access to the Internet, this book and software combination is a good package. The best part about it is its included preconfigured software. Dec 94
- \*\*\* MacLink Plus/Translators Pro 7.5, DataViz, 203/268-0030, \$149. If your PC files are in archaic formats, you'll need this file-transfer and translation utility. It's a great option for most users. Apr 94
- ★★★ MicroPhone Pro 2.0, Software Ventures Corp., 510/644-3232, \$295. The new feature set of this communications package includes multiple sessions, faxing, TCP/IP networking, and more, but it's a mixed bag. Not all the features are well integrated, although some are innovations for which users will be grateful. Oct 94
- ★ PowerShare Collaboration Servers, Apple Computer, 408/996-1010, \$999. Before this collaboration software will be ready for prime time, Apple needs to overhaul the Admin application, add serious diagnostic aids and provide comprehensive documentation. Aug 94
- \*\*\* QuickMail 3.0, CE Software, 515/221-1801, \$199 to \$3799. If you're shopping for a first-time E-mail application, this product is a good choice for ease of use and setup. The most promising new tool, rules-based messaging, lacks some important features. Jan 95
- \*\*\* RunShare, Run, Inc., 408/353-8423, 5199 to 52499. System extension endeavors to pump up file-transfer speeds across both local- and wide-area networks. It offers twofold to threefold throughput gains for fast Macs and large files but is less useful with small files

or slow Macs. Feb 95

- \*\*\* SITcomm 1.0 (1.0.1), Aladdin Systems, 408/761-6200, \$120. Inexpensive telecommunications software is fairly easy to set up and use, and will do well for people who use just one or two online services. Apr 94
- \*\*\* Snap Mail 1.0.1, Casady & Greene, 408/ 484-9228, \$200 to \$1440. Software will put you on the E-mail trail more cheaply than any competing product, if you can live with some minor shortcomings. Jun 94
- ★★ SoftWindows 1.0, Insignia Solutions, 415/ 694-7600, \$499. You can run Windows software on a PowerMac with this emulation software, but although it's a viable solution, you pay the price in terms of performance, compatibility, and actual cost. Aug 94 ♦
- \*\*\* Timbuktu Pro 1.0 (1.05), Farallon Computing, 510/814-5000, \$199 to \$1999. Terminal emulation product is a must-have for people who need direct connection to computer systems on a variety of networks. May 94
- ★★ TrafficWatch II 2.0 (2.1), Neon Software, 510/283-9771, \$495. The price of this AppleTalk traffic monitor is closer to that of full-blown network analyzers that do much more. Without printing, alarms, or true multiprotocol support, this product misses the mark. Jun 94 ★★★ White Knight 12.0, The FreeSoft Company, 412/846-2700, \$139. While this telecom software can be bewildering, it works impressively well. If you're willing to read the manual, the program may become your favorite telecom tool. Nov 94 ◆

#### DESKTOP PUBLISHING

- ★★ CheckPost 1.3, Working Software, 408/ 423-5696, \$249.95. Interface aside, this imagesettersimulation software is generally disappointing. It can't automatically scale pages, it prints on a single sheet, and its error reporting is limited. Nov 94
- ★★★ ClickBook 1.1, BookMaker Corp., 415/ 354-8161, \$69.95. If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. Nov 94
- \*\*\* Download Mechanic 1.0.2, Acquired Knowledge, 619/587-4668, \$249. The strengths of this PostScript downloader lie in its tools for dealing with problem files, but when dealing with large files, it performs slowly and occasionally crashes. Feb 95
- \*\*\* FontChameleon 1.0.1 (1.5), Ares Software Corp., 415/578-9090, \$295. Font utility introduces a new font-creation technology; it builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus the ability to customize fonts. Sep 94
- \*\* FontMixer 1.0, Monotype Typography, 312/855-1440, \$79. Although a tad expensive for a one-trick pony, this font utility is a straightforward, relatively painless way to mix characters from different fonts to create composite fonts. Oct 94
- \*\*\* Fontographer 4.0.4 (4.1), Altsys Corp., 214/680-2060, \$495. No other font editor does more than this one. For the price of a few font families, it can give you a universe of unique faces. Oct 94 
  \*\* FotoTune 1.1 (1.13), Agfa Division of Miles, 508/658-5600, \$395. Color-management software has a capable engine, but it's not a complete color management system. Invisible tech support and poor documentation were only part of the problem. Apr 94
- \*\*\* LaserCheck 1.0, Systems of Merritt, 205/660-1240, \$199. Imagesetter-simulation software

can save you hundreds of dollars, and many hours, on imagesetting jobs by letting you use a laser printer to proof your work. **Nov 94** 

- \*\*\* Let'er RIP 2.0, Lupin Software, 916/ 756-7267, \$239. The flexibility, clean implementation, and attention to detail of this PostScript downloader make it a pleasure to use. Feb 95
- \*\*\* PageTools 1.0, Extensis Corp., 503/ 274-2020, \$129. Collection of ten PageMaker Additions is packed with utility. Many users will find the PageAlign, PagePrinter, and PageRulers Additions alone worth the price, and the others frosting on the cake. Dec 94
- \*\*\* Print Shop Deluxe 1.0 (1.1), Brøderbund Software, 415/382-4400, \$49.95. Even the most ham-fingered can create professional-looking greeting cards, signs, banners, stationery, and calendars with these desktop publishing templates and graphics. While it's not a substitute for a high-end program, it is easy to use and inexpensive. Apr 94
- \*\*\* ReadySetGo 6.0.2, Manhattan Graphics Corp., 914/725-2048, \$395. There's no strong reason not to use this destop publishing software if its tools meet your needs, but there's no compelling reason to choose it, either. Its low price is nice, but not enough. Oct 94

#### EDUCATION/ENTERTAINMENT

- \*\*\*\* A.D.A.M. The Inside Story,
  A.D.A.M. Software, 404/980-0888, \$79.95.

  Multimedia anatomy CD-ROM teaches basic anatomy and
  physiology with a tantalizing mix of sound, graphics, and
  animation. If you are the least bit interested in learning more
  about how the human body works, buy this program. Mar 95

  \*\* Aquazone 1.0, Inago, 416/487-4005,
  \$79.95. The fish in this aquarium simulation are beautiful, but they're darned hard to keep alive. Only two varieties
  of fish are included. Jan 95
- Creative Writer 1.0, Microsoft Corp., 206/882-8080, \$64.95. Graphics/page-layout/word-processor hybrid offers some terrific type effects, zany sounds, and bright graphics. While it doesn't teach kids to be better writers, it does encourage them to develop ideas and provides a fun vehicle to express those ideas creatively. Sep 94 \*\*\* Crossword Wizard 1.0, Cogix Corp., 415/454-7217, \$49.95. If you're a crossword fan, this crossword-puzzle generator is a must. Although it's not perfect, the play mechanics are fantastic. Dec 94
- \*\* The Cruncher, Davidson & Associates, 310/793-0600, \$59.95. If you want to teach a child spreadsheet basics, this combination educational spreadsheet and business application will do the job. It's creative and easy to use, but slow. Aug 94
- \*\*\* Crystal Crazy, Casady & Greene, 408/
  484-9228, \$49.95. Ultraglossy, superpolished version of the classic Crystal Quest is challenging and fun without being overly difficult. Each level retains some old elements, and adds some new ones to keep you on your toes. Jun 94

  \*\*\* Firefall Arcade 1.0 (1.0.2), Inline Soft-
- ware, 617/935-1515, \$49.95. If you loved the classic video game Centipede, or are just looking for a fun shoot-tem-up, this arcade-style game will satisfy. Jun 94
- \*\*\* Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, \$395. CD-ROM encyclopedia has excellent search capabilities, weighs much less than a shelf of books, and is lots of fun, its timeliness and some hierarchical snafus were slight problems. Jul 94
- \*\*\* Kids World, Bit Jugglers, 415/968-3908, \$30. Although the painting tools could be more robust,

this screen-saver-creation tool for kids is easy to use, cleverly designed, and can keep kids busy for hours. Mar 95 \*\*\* SimCity 2000, Maxis Software, 510/ 254-9700, \$54.95. Your goal with this marvelous citysimulation is to build a city and run it successfully. The game is fascinatingly complex but it's simple to use. Jun 94 \*\*\* Small Blue Planet 1.2.1, Now What Software, 415/885-3432, \$79.95, Nicely integrated collection of beautiful Earth-from-space images on CD-ROM lacks many features of standard atlases and doesn't have a search function, but is endlessly fascinating. Jul 94 \*\*\* Spin Doctor (1.0), Callisto Corp., 508/ 655-0707, \$59.95. In the tradition of the best Macintosh games, this game tests your wits and reflexes alike. It's part strategy game, part kinetic sculpture. Jun 94 \*\*\* WarPlanes 1.0, Maris Software, 800/ 336-0185, \$69, Wonderful multimedia CD-ROM tours the post-WWII era in military aviation. As well as pictures and text, it includes rotatable models of aircraft, an exten-

#### FINANCE/ACCOUNTING

sive database, campaign maps, historical narration, live

combat audio, and three flight simulators. Mar 95

\*\*\* Andrew Tobias' TaxCut 1993, MECA Software, 203/255-1441, \$79.95. The free-form approach and flexible Help menus of this tax-preparation software make filling out your tax return a smooth, almost relaxing process. Apr 94

\*\*\* ExpensePlus 1.0.1 (1.0.2), State of the Art, 714/753-1222, \$139.95. Software uses a Newton MessagePad to record expenses, then sends the data to a Mac to create and print expense reports. Apr 94

\*\* Financial Competence 1.5, Competence Software, 603/435-5098, \$99. Business economics tutorial explains how financial statements are compiled and how they relate to each other. Jul 94

\*\*\* MacInTax 1993, Intuit, 602/295-3110, \$69.95. Tax-preparation software provides a reliable, structured interface for building your tax return. Apr 94

\*\*\* MacInTax Tax Planner, Intuit, 602/295-3110, \$29.95. Construct a five-year forecast of your tax liability, projecting tax figures through 1997 in a concise summary format. Apr 94

★★★ MacInTax Tax Savings Guide, Intuit, 602/295-3110, \$19.95. Collection of tax tips and suggestions is designed to help you better understand your tax return and reduce your tax liability. Apr 94

\*\* MacMoney 4.01, Survivor Software, 310/410-9527, \$89.95. Personal-finance software has new and improved features that will please longtime users, but it hasn't kept up with the leaders in the field and won't win many new converts. Jul 94

\*\*\* Managing Your Money 6.0, MECA Software, 203/255-1441, \$79.95. Personal-finance program does a good if somewhat roundabout job of keeping track of your total financial picture. Although it isn't as easy to use as the competition, it excels in tax, investment, and financial planning. Jun 94

\*\*\* Quicken 5.0, Intuit, 415/322-0573, \$49.95. The addition of a calendar and new ease-of-use features keep this personal-finance software comfortably ahead of the pack. This upgrade is an incremental, but welcome, improvement to an already excellent product. Feb 95

\*\* StreetSmart 1.0, Charles Schwab & Company, 800/334-4455, \$59. If Schwab is where you want your investments held, and if you want to have

tighter control over your portfolio and save on brokerage

fees, you should seriously consider this financial investment software. Feb 95

#### GRAPHICS

\*\*\*
Adobe Illustrator 5.5, Adobe Systems, 415/961-4400, \$595. Despite slight speed disappointments, this draw program's upgrade is a bargain. It includes more than 200 tile patterns, 220 fonts, and the Acrobat Distiller and Exchange utilities. Sep 94

\*\*\* Adobe Photoshop 3.0, Adobe Systems, 415/961-4400, \$895. Image-editing program both broadens its capabilities and simplifies its work environment in this dynamic upgrade. While not perfect, the pros far outweigh the cons. Jan 95

★★ Art Explorer 1.0, Aldus Consumer Division, 619/558-6000, \$49.95. While its cartoon style is refreshing, this paint/draw program for kids 8 to 12 years old is still rough around the edges. Its biggest limitation is that it's unusably slow on 68030 Macs. Feb 95

\*\*\* Blueprint 5.0, Graphsoft, 410/290-5114, \$295. For plain old 2-D drafting, this CAD software has a rich, easy-to-use feature set and is admirably fast. The Power Mac version in particular is a first choice for large architectural or engineering diagrams. Jan 95

★★★ ClarisDraw 1.0, Claris Corp., 408/727-8277, \$399. For presentations without grand artistic pretensions, this draw program can be an effective tool. However, \$400 may be too much to pay. Jan 95

★★★ Dabbler 1.0, Fractal Design Corp., 408/ 688-5300, \$99. Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface, at a great price. Nov 94

\*\*\* DeBabelizer Lite 1.0 (1.1), Equilibrium Technologies, 415/332-4343, \$129. Terrific graphics utility converts graphics files from one format to another. It offers a choice selection of capabilities at a nice, slim price. Aug 94

★★★ DesignWorkshop 1.0 (1.1), Artifice, 503/345-7421, \$895. The accessible interface and versatile modeling environment of this 3-D modeling software may be worth the fairly high price, particularly for architectural-design conceptualization. May 94 (3)

\*\*\*
ElectricImage Animation System 2.0,
Electric Image, 818/577-1627, \$7495. Although
the price seems high, this software, with its extraordinary
animation and image-rendering capabilities, is worth every
penny for cinematic-production professionals. Dec 94

\*\*\* Flying Colors, Davidson & Associates, 310/793-0600, \$40. While not the most dynamic kids' program, this paint/draw program provides easy-to-use tools and nicely drawn stamps for ages eight to adult. Feb 95

\*\*\* IntelliDraw 2.0, Adobe Systems, 619/ 558-6000, \$129. Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Despite its breadth of features, it always feels approachable. Sep 94

\*\*\*\*
Kai's Power Tools 2.0a (2.1), HSC Software, 310/392-8441, \$199. Phenomenally powerful suite of Photoshop plug-ins have an addictive quality typically associated with arcade games. May 94

\*\*\* Koyn Fractal Studio 2.02 (2.1), Koyn Software, 314/878-9125, \$119.95. Software lets you generate beautiful fractals of your own design. It's a reasonable choice if you are interested in Sierpinski triangles or naturalistic forms, but it's not an all-fractals-for-all-people program. Aug 94 (3)

\*\*\* KPT Bryce 1.0, HSC Software, 805/ 566-6200, \$199. For less than \$200, you get a remarkable 3-D landscape-rendering program, a CD-ROM full of images, a slide-show utility, and even some screen-saver modules. Although the innovative, graphics-heavy interface can be confusing, this software is lots of fun. **Dec 94** 

★★★ Live Picture 1.5.5, HSC Software, 805/
566-6200, \$3995. Promising image editor is rather rudely assembled atop some marvelous technology and burdened by an extremely high price tag. Though fast and blessed with all the benefits of a proxy-based system, its day-to-day functions leave room for improvement. Dec 94 ★★★ LogoMotion 1.0, Specular International, 413/253-3100, \$149. Easy-to-use 3-D package is eminently affordable. It's a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94 ◆

\*\*\* MacDraft 4.0, Innovative Data Design, 510/680-6818, \$449. Report-links to Excel and a clean interface make this 2-D CAD software an excellent choice for use in mechanical engineering and construction. Plus, it's easy to learn. Mar 95

★★★ MacroModel, Macromedia, 415/252-2000, \$1495. This 3-D modeling software is a solid resource to have along when you venture out into 3-D space. The interface is elegantly simple. May 94 ◀

\*\*\* MetaFlo', The VALIS Group, 415/435-5404, \$595. Graphics utility yields interesting visual effects with a minimum of fuss. It imparts elasticity to 2-D images, letting you push and pull collections of pixels while retaining the visual integrity of the image. Aug 94

\*\*\* MiniCad 5, Graphsoft, 410/290-5114, \$795. Excellent CAD software offers major performance for its price. It's admirably easy to learn. Nov 94

\*\*\* Paint Alchemy 1.0, Xaos Tools, 415/487-7000, \$99. These plug-in graphics effects are a tremendous value that both casual users and professional artists can use to design a little chaos into their work. May 94

\*\* PhotoMatic 1.01, DayStar Digital, 404/
967-2077, \$199. AppleScript-based utility lets you automate tasks in Adobe Photoshop 2.5.1 or later. Although it's limited, it can relieve you of mundane chores. Nov 94

\*\*\* Pixar Typestry 2.1, Pixar, 510/236-4000, \$299. With QuickDraw GX support, an approachable interface, a strong array of animation features, and outstanding image quality, this 3-D type-effects software is worth a try. It adds a new dimension to the way you look at type. Feb 95

\*\*\* PixelPaint Pro 3.01, Pixel Resources, 404/449-4947, \$379. Color paint program strikes a good balance between the artistic demands of color painting and the technical precision of image processing. Mar 95 \*\* Pointillist, Pictor GraFX, 310/865-0495, \$39.95. Stereogram software creates images that look like random dots, but a 3-D image emerges from the pattern and appears to hover in front of the background. Jul 94 \*\* Ray Dream Designer 3.1.1, Ray Dream, 415/960-0768, \$349. 3-D graphics program provides competent (if sometimes awkward) modeling tools, offers excellent surface-texturing capabilities, and produces high-quality ray-traced renderings. Mar 95 \*\*

★★★ ScanPrepPro 1.2, ImageXpress, 404/ 564-9924, \$695. Adobe Photoshop add-on automates the scanning and image-massaging process and produces good results, although it's somewhat unstable. Nov 94

\*\*\* Scenery Animator 1.0.4 (1.1), Natural Graphics, 916/624-1436, \$149. Landscape rendering and animation software uses U.S. Geographical Survey data to create remarkably realistic 3-D representations of terrain. Its flaws are few, and our reviewer continues

# **Star Ratings**

recommends it. Aug 94 🔾

★★★ Showplace 2.0 (2.1), Pixar, 510/236-4000, \$495. Adequate, entry-level, 3-D modeler is suitable for illustration and other graphic arts applications. This version offers improved access to MacRenderMan, one of the best renderers around, plus plug-in modeling tools. Apr 94

\*\*\* Specular Collage 2.0.1, Specular International, 413/253-3100, \$399. Practical image-compositing solution supplies a smooth interface and strong support for Adobe Photoshop 3.0. As long as you're willing to return to Photoshop to confirm your edits and make final changes, it's a serviceable tool. Feb 95

Terrazzo 1.0, Xaos Tools, 415/487-7000, \$199. Turning a random group of pixels into a geometric pattern may not be everyone's passion, but this plug-in graphic-effects module has appeal for a select niche of fabric, graphic, and video designers. Nov 94

\*\*\* TextureScape 1.5, Specular International, 413/253-3100, \$195. Algorithmic art program lets you manipulate and arrange PostScript shapes to create seamlessly repeating patterns. Like the best tools, it's simple enough to be fun and flexible enough to give you meaningful control. Feb 95

Typestry 2.0 (2.1), Pixar, 510/236-4000, \$299. An approachable interface, animation support, and outstanding Renderman rendering technology make this 3-D type-renderer a popular choice. Jun 94 

\*\*\* TypeTwister 1.0, Adobe Systems, 415/961-4400, \$29.95. Inexpensive, easy-to-use, and fun type styler lets you create wildly styled text effects, although it won't satisfy hard-core type manipulators. Jan 95 

\*\*\* Vistapro 3.0, Virtual Reality Laboratories, 805/545-8515, \$149.95. 3-D landscape rendering software uses digital versions of U. S. Geological Survey maps to create images and allows you to add external features such as buildings and rivers. Although it's a good program. It has some limitations. Feb 95

#### MATH/SCIENCE

\*\*\* Caduceus Science Review Macintosh
Project 1.0 (1.1), Scientia, 617/776-3427, \$250.

If you're taking the MCAT, you'd be nuts not to buy this
interactive science review. With proper use, its 9MB of files
are certain to improve your score. Apr 94

\*\*\*
Chamber Works 1.0.2 (1.1), OnScreen Science, 617/776-6416, \$99. Simulator for particle-physics events is the best introduction to particle physics yet produced, at a great price. Dec 94

\*\*\* JMP 3.0, SAS Institute, 919/677-8000, \$695. New features of this statistics software include floating tool palettes, an annotation tool for data tables, and an experimental-design module. Sep 94

\*\*\* Kekulé 1.1, PSI International, 410/821-5980, \$495. Science software reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. Nov 94

\*\*\*
LabView for Mac 3.0.1, National Instruments, 512/338-9119, \$1995. For large-scale, demanding projects in data acquisition and analysis, this scientific software is an unchallenged standard. Jul 94

★★★ Maple V 3.0, Waterloo Maple Software, 519/747-2373, \$795. If you prefer to do your own programming and function creation, you'll benefit from this symbolic mathematics software's efficient use of your Mac's resources. This version hits most of the points on your symbolic-math wish list. Oct 94 \*\*\* MATLAB 4.1, The Math Works, 508/ 653-1415, \$1695. Relatively expensive numerical math software has added nearly 100 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. Nov 94

\*\*\*
Resampling Stats 1.0, Resampling Stats, Inc., 703/522-2713, \$225. Innovative statistics software has proved itself to be a superior teaching tool in numerous classroom tests. If you have any interest in statistics, you should give this admirably straightforward approach careful consideration. Jun 94

\*\*\* SerePlot 2.12, Scientfic Visions, 301/ 593-0317, \$135. If you have piles of data and don't need animated, exploding bar-charts in 24-bit color, this scriptable plotting software should be part of your analysis tool kit. Jun 94

★★★ Spyglass Plot 1.0, Spyglass, 217/355-6000, \$295. This scientific-charting software is the first choice for serious large-set plot crunching. Oct 94

\*\*\* Statistica/Mac 4.1, StatSoft, 918/ 583-4149, \$695. At present, this statistical software is the undisputed features-per-dollar champion in the Mac market. Mar 95

\*\*\* SuperScope II 1.25, GW Instruments, 617/625-4096, \$1490. Despite a relatively small instrument library, this laboratory data-acquisition software effectively covers a wide range of needs, and learning to use it won't become your life's work. Oct 94

\*\*\* Survival Tools 1.0, Abacus Concepts, 510/540-1949, \$295. The combination of survival analysis with the StatView template systems gives you a virtual actuary-in-a-box. It's a great set of tools, conveniently packaged. Feb 95

#### ORGANIZATION/PRODUCTIVITY

\*\*\* ACT 2.0, Symantec Corp., 503/334-6054, \$249.95. Contact manager's file-level compatibility with DOS and Windows and its complete contact management make it worth considering if you can live with its weak scheduling functions. Mar 95

\*\*\* Arrange 2.0, Common Knowledge, 415/325-9900, \$349. If your needs fall beyond the usual calendar and address-book functions, this personal information manager is a strong contender. It now has more calendar functions and print options. Dec 94

\*\*\* Claris Organizer, Claris Corp., 408/727-8227, \$99. New personal information manager users, lured by the low price, good performance, and ease of use of this product, will find that it meets their needs. Most longtime PIM users won't be tempted to switch. Jan 95

\*\*\* DateBook & TouchBase Pro Bundle
4.0, Adobe Systems, 619/558-6000, \$89.99.
Personal information manager package is now easier to use
and offers many new features. The excellent linking between contacts and calendar is the most significant feature.
Sep 94

★★★ DateView 1.0.1 (1.0.2), Advanced Software, 515/225-4163, \$99.95. If you're willing to sacrifice some features to get simplicity and speed, this calendar/to-do manager makes sense. It integrates with the contact manager, InTouch. Aug 94

★★★ Dynodex for Macintosh 3.5, Portfolio Software, 802/434-6400, \$69.95. Excellent contact manager has a few new features, improved performance, and an easier-to-use interface. \$ep 94\$

\*\*\* FastPace Instant Contact 1.0, Foresight Technology, 817/731-4444, \$79.99. Although this contact manager could use a few additional features—es-

pecially a menu-bar search function—it does a capable job, and it is intuitive and easy to use. Jan 95

\*\*\* First Things First Proactive 1.1, Visionary Software, 503/246-6200, \$149. Capable scheduling program has some convenient features. It's worth a look if you don't have to share information with a contact manager. Nov 94

\*\*\* Full Contact 2.01 (2.02), FIT Software, 408/562-5990, \$169. Personal information manager can handle with speed and style tasks that would choke other products, but frequently, using it feels like a full-time job. Aug 94 ©

\*\*\* In Control 3.0.4, Attain Corp., 617/ 776-1110, \$85. Excellent to-do-list manager and outliner, coupled with a good calendar is a strong choice if you live and die by to-do lists. Oct 94

★★ Souvenir 2.2, ComposeTel, 415/327-0744, \$49. While this contact manager is fast and simple, it's hard to recommend it when you can buy integrated contact managers and schedulers for the same price. Dec 94 ★★★ TimeSquare 1.0, Team Building Technologies, 514/278-3010, \$149. Fast, flexible, network calendar program has lots of handy features, but it's missing a few as well, such as multiday events and label grouping. Aug 94

#### PRESENTATION TOOLS

\*\*\* Adobe Premiere 4.0, Adobe Systems, 415/961-4400, \$795. Video-editing software for the Power Mac remains solid and reliable and has new and improved professional-level features. With the right hardware, it can give desktop-video editors broadcast-quality products with a minimum of compromises. Dec 94

\*\*\* Amazing Animation, Claris Corp., 408/ 727-8277, \$59. Cute pictures, funny sounds, and a kidfriendly interface come together in this package that lets children produce short animations or interactive presentations. The canned animations and scenes grow tiresome, however, Jan 95

\*\* Animation Master 2.0.5, Hash Enterprises, 206/750-0042, \$699. Although this animation software packs extraordinary power at a reasonable price, it's difficult to learn and prone to instability. Oct 94

★★★ Deck II 2.1, OSC, 415/252-0460, \$399.

AV Macs turn into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn't include equalization features.

Jun 94

\*\*\* FlipBook 1.0, S. H. Pierce, 617/338-2222, \$89. Animation printing utility lets users make flip-books out of QuickTime movies, PICS animations, and Scrapbook files. Jun 94

★★★ HyperCard 2.2, Apple Computer, 408/ 996-1010, \$249. Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happily building stacks. Sep 94

\*\*\* Macromedia Director 4.0, Macromedia, 415/252-2000, \$1195. Although this multimedia program remains far from easy to use, this admirable upgrade increases the program's power and improves its interface. Multimedia professionals will continue to find it the best package available. Sep 94

\*\*\* Microsoft PowerPoint 4.0, Microsoft Corp., 206/882-8080, \$399. If you're in the market for a presentation-graphics program, this is a good choice to use along with Word or Excel, as long as you don't mind the lack of animation functions. For general purposes, though,

other alternatives have the edge. Feb 95

★★★ Morph 2.0 (2.5), Gryphon Software, 619/454-6836, \$239. Easy to use morphing software is beautifully designed, with delightful new features, including the ability to morph QuickTime movies. Using it is as painless as morphing gets. Apr 94 ◆

★★ MovieWorks 2.0.2, Interactive Solutions, 415/377-0136, \$295. With diligence you can get decent results with this all-in-one QuickTime-based multimedia package. But other entry-level programs make leaping into multimedia easier and more rewarding. Sep 94

\*\*\* The Multimedia Workshop 1.0, Davidson & Associates, 310/793-0600, \$79.95. Children or adults can use this media-integration tool without big investments of either time or money. It's full of compromises, though. Nov 94

★★★ Passport Producer Pro 1.0 (1.1.2), Passport Designs, 415/726-0280, \$995. Superb, albeit quite expensive, media-integration package makes assembling even complex presentations surprisingly easy. Path animation is limited to entrances and exits. Apr 94

\*\*\* Persuasion 3.0, Adobe Systems, 206/ 622-5500, \$339. Users have plenty of new features to cheer about, including improved tool palettes, extensive charting options, and hypertext functions with this presentation graphics program's upgrade. High memory and disk-space requirements are drawbacks. Sep 94

★★★ SoundEdit 16, Macromedia, 415/252-2000, \$379. Digital audio software supports 16-bit sound and has enough goodies to earn it a place in a multimedia producer's toolbox. But its lack of record-level controls limits its usefulness as a professional audio tool. Dec 94

\*\*\* SuperCard 1.7.1, Allegiant Technologies, 619/587-0500, \$495. Multimedia authoring system adds a few welcome enhancements, including QuickTime support, and squashes some old bugs. For current users, the upgrade is well worth the price; for others, it's an excellent alternative to more expensive authoring systems. Feb 95

#### PROGRAMMING

★★★★ IDL 3.5, Research Systems, 303/786-9900, \$1500. If you're an image processing professional, you should consider adding this shockingly powerful, compact, graphics-oriented, interpreted language to your tool kit. Oct 94

\*\*\* Object Master for Think C and C++, ACI US, 408/252-4444, \$255. Object-oriented development environment is full of goodies and will pay for itself due to increased programmer productivity. Apr 94 3 ScriptWizard 1.0, Full Moon Software, 408/253-7199, \$99. Software attempts to make writing and debugging AppleScript scripts easier but doesn't offer enough improvement over Apple's Script Editor. Jan 95 VIP BASIC 1.0.1 (1.0.3), Mainstay, 805/ 484-9400, \$295. Programming language lets programmers who know only BASIC get started producing real, if interpreted, Mac programs. It's a serious developer's tool, though it's not on the same footing as VIP-C. Jun 94 \*\*\* VIP-C 1.0.1 (1.5.1), Mainstay, 805/ 484-9400, \$495. If you've mastered the rudiments of C, this programming-code generator will let you code about ten times faster than you could using only an editor. Its real strength is in rapidly assembling smaller projects. May 94 3 \*\*\* VIP-C 1.5, Mainstay, 805/484-9400, \$495. For convenience in producing 680X0/Power Macintosh applications, this programming utility is a fine investment. Intermediate to advanced users will get the most

benefit, but even beginners will find that it helps turn student projects into serious apps. Feb 95 🔾

#### UTILITIES

★★ Apple Personal Diagnostics 1.0 (1.1), Apple Computer, 408/996-1010, \$129. In trying to make a hardware tool for the rest of us, Apple has come up short. This hardware-diagnostics utility has an uneven manual, some less than thorough tests, and a surprisingly unsatisfying interface. Nov 94 ⑤

\*\*\* AppleSearch 1.0, Apple Computer, 408/ 996-1010, \$1799. Although it has some rough edges, this product for archiving and retrieving text is highly useful. It presents retrieved information clearly and extracts text from documents in many formats. May 94

\*\*\* Atticus Vista 1.0 (1.0.2), Atticus Software Corp., 203/348-6100, \$69.95. Control panel and application automatically catalog the disks you mount on the desktop. It has a few problems, but it can help bring order to disorganized disk collections. May 94

\*\*\* Automap Road Atlas for Macintosh
2.01 (2.04), Automap, 206/455-3552, \$99.95.

Mapping software tells you how to get where you're going better than any other map or software our reviewer has seen. Although screen redraw is slow, it's worth it for the written directions and maps. Jul 94

\*\*\* Cal 1.0, Thought I Could, 212/673-9724, \$79.95. Well-chosen set of desktop necessities includes an excellent calculator, an associated-formula editor, a datebook, and a calendar. Due to its easy access and ample power, this software has become an everyday tool for our reviewer. Jan 95

★★★ CD AllCache 2.0, CharisMac Engineering, 916/885-4420, \$79.95. CD-ROM accelerator improves access time by caching a CD's directory and putting its most frequently used data into RAM. Despite this software's limitations, most CD addicts will find the speed improvement worth the trouble. Sep 94

★★★ CD-ROM ToolKit 1.0.5 (1.1), FWB, 415/474-8055, \$79. Software accelerator can halve the time it takes to open files and search on a CD-ROM. May 94 ♥

\*\*\*\*
Conflict Catcher II 2.1.1, Casady & Greene, 408/484-9228, \$79.95. Customizable, fast, and safe extension-management utility goes well beyond the basics. For Power Macintosh users, it even tells which extensions aren't written in native code and are likely to slow down Power Macs. Oct 94

★★★ DiskDoubler 4.0, Symantec Corp., 503/ 334-6054, \$79.95. In pure efficiency terms, this filecompression software is a winner, but it lacks many features of previous versions, including passwords on self-extracting files and automatic recompression. Aug 94

★★★ DiskGuard 1.0.1 and DiskGuard Remote, ASD Software, 909/624-2594, \$129 to \$799. Rock-solid, flexible disk-protection tools are worth serious consideration if your Mac or Macs are accessible to others. The remote version (in five- and ten-user packs) adds network features, including a clock-synchronization function. Mar 95

\*\*\* DiskTop 4.5 (4.5.1), PrairieSoft, 515/ 225-3720, \$99.95. Organizing a crammed hard drive is a more manageable task with this simple but powerful file-management utility that lets you copy, move, rename, delete, and find files—without using the Finder. Jul 94

\*\*\* Drive 7 3.0, Casa Blanca Works, 415/ 461-2227, \$79.95. Highly recommended hard driveformatting utility easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. **Nov 94** 

eDisk 2.0, Alysis Software Corp., 415/ 928-2895, \$149.95. Driver-level software compresses data read to your drive on the fly and automatically expands data read from your drive. It offers transparent compression. Dec 94

\*\*\*
Icon Mania 1.0 (1.01), Dubl-Click
Software, 503/317-0355, \$69.95. Delightful iconediting utility comes with terrific tools for building new icons,
including an outstanding thumbnail feature that builds custom icons from graphics files. Aug 94

\*\*\* Kaboom 3.0, Nova Development Corp., 818/591-9600, \$49.95. Sound-effects utility with sound-editing application is a fun program for anyone who wants to play with sound. Feb 95

\*\*\* Launch Pad 1.0, Berkeley Systems, 510/540-5535, \$49.99. If you want to share your Mac with your kids, this desktop utility is a worthwhile investment. It can even speak menu items and file names out loud for kids too young to read. Jan 95

\*\*\* Maxima 3.0, Connectix, 415/571-5100, \$99. If you have more than 8MB of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. Nov 94

\*\*\*
Norton DiskDoublerPro 1.1, Symantec Corp., 503/334-6054, \$109. Utility collection includes DiskDoubler, AutoDoubler, and CopyDoubler. Because of its ease of use, the product is a good choice for beginners. Feb 95

\*\*\* Norton Utilities for Macintosh 3.1, Symantec Corp., 503/334-6054, \$149.95. Dataprotection and -recovery utility collection is leaner, meaner, and faster than ever before, but it's also surprisingly uneven. While Disk Doctor leads the pack for disk-repair utilities, the back-up module is weak and the new UnErase module is missing some features. Feb 95

\*\*\* Now Utilities 5.0, Now Software, 503/
274-2800, \$89. Three of the modules of this fine-tuned, interlocking utility set—Now FolderMenus, Now Menus, and Now SuperBoomerang—are almost indispensable, and the other six are well worth considering. Jan 95

★★★ Open Sesame 1.02 (1.1), Charles River Analytics, 617/491-3474, \$99. Utility automates Finder operations without macros or scripts. People with strict work habits are more likely to find its suggestions worthwhile than are those who don't follow a routine. May 94 €

\*\*\* Peirce Print Tools 1.0, Peirce Software, 408/244-6554, \$129. Nine handy printing utilities work with QuickDraw GX. Most of the modules are useful, but not all are must-haves. Jan 95

★★★ PopupFolder 1.0 (1.5), Inline Software, 617/935-1515, \$59.95. Finder utility is handy and easy to use, but sometimes sluggish. Aug 94

\*\*\* PowerAgent 1.1, SouthBeach Software Corp., 305/858-8416, \$159. You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro. Nov 94

\*\*\* PowerMerge 2.0, Leader Technologies, 714/757-1787, \$129. Powerful file-management tool helps you keep individual files, folders, or entire volumes organized and up-to-date. This version lets you compare and launch documents, rename files, trash superfluous files, and lots more. Aug 94

★★★ ProFiles 1.0, Dayna Communications,

# Star Ratings

801/269-7200, \$129. Unusual new utility lets you group related files and folders for quick access and actions such as making aliases, copying, turning sharing on and off, and more. The recommended RAM allocation of 1MB may be a problem for computers with limited memory. Aug 94

\*\*\* RAM Doubler 1.0.1 (1.5), Connectix
Corp., 415/571-5100, \$99. Inexpensive system extension doubles available RAM for many Mac users. There are a number of requirements, however, including System 7, 4MB of physical RAM, and a 68030 board. May 94 3

\*\* SCSI Director Pro 3.0.6, Transoft Corp., 805/565-5200, \$99. Utility provides simple, one-button hard disk formatting, but when it comes to doing some of the fancy tricks, the going gets rough and technical support costs \$1.90 per minute. Sep 94

★★★ Square One 2.0, Binary Software, 310/449-1481, \$74. The slick design, flexibility, and straightforward interface of this file-launching utility make it a pleasure to use. Dec 94

\*\*\* Stop & Go 4.0, Engram International, 415/455-1100, \$69.99. File-protection/relaunch utility uses a portion of your hard disk to save a snapshot of the data in your Mac's RAM. It's fast, and it relaunches files, applications, and extensions in a single, unified process, but it's unduly complicated. Oct 94

★★★ UnderWare 1.0.1, Bit Jugglers, 415/ 968-3908, \$59.95. Inspired, silly fun for your Mac's desktop comes from a control panel that adds three features: a screen saver, desktop patterns, and animations that run on your desktop while you work. Jun 94

\*\*\* Virex 5.0 (5.03), Datawatch Corp., 919/549-0711, \$99.95. The extremely fast, trouble-free performance of this software makes the task of guarding against computer viruses almost painless. May 94

\*\*\*
VirtualDisk 1.1a (2.0), Continuum
Software, 206/695-8136, \$79. Rapid disk cataloging; fast, efficient label-printing; and an excellent disk-copy utility make this software a wonderful value. Jul 94

\*\*\* Wiz Tools for PowerBook 1.2.2, ASD Software, 909/624-2594, \$79.95. The connectivity, file-synchronizing, and security features of this collection of PowerBook utilities are appealing, but the rest of the modules are also-rans. Jan 95

#### VERTICAL MARKETS

\*\*\* Autoscore 1.0, Wildcat Canyon Software, 510/527-5155, \$150. Converting the human voice into MIDI note information is a challenging task. If you have the right music software, the right mike, and the right voice, this music-recognition software can actually pull it off. Feb 95

\*\*\* Bird Brain 2.01, Ideaform, 515/472-7256, \$125. Database lets bird watchers record every sighting of every bird they have ever seen to create electronic life lists. Although it can be slow, it includes species names and other information. Jan 95

\*\*\* Claire, The Personal Music Coach
1.0.1, Opcode Systems, 415/856-3333,
\$129.95. Musicianship program teaches pitch and interval recognition, sight singing, and intonation. Although the interface is nonstandard, it's easy to learn. May 94

★★★ DigiTrax 1.1, Alaska Software, 408/738-3320, \$349. If you're an amateur musician or a multimedia producer with modest sound-recording needs and you have a Quadra AV, consider this audio-recording software. What it lacks in features, it makes up for in simplicity and a relatively low price tag. Mar 95

\*\* ErgoKnowledge 1.0, Visionary Soft-

ware, 503/246-6200, \$395. Despite a few shortcomings, this CD-ROM offers a good, basic review of officecomputer ergonomics. Dec 94

\*\*\* MayaCalc 2.3.1, Ecological Linguistics, 202/546-5862, \$120. 4th Dimension database alleviates much of the pain involved in working with the complex, multilayered Maya calendar. Feb 95

\*\*\* Maya Hieroglyphic Fonts, Ecological Linguistics, 202/546-5862, \$10 to \$60 per set. Although these fonts based on Mesoamerican hieroglyphic scripts are beautifully rendered, the character spacing is sometimes uneven. Feb 95

\*\*\* Mayo Clinic Family Health Book 1.2,
IVI Publishing, 612/686-0779, \$69.95. Medical
CD-ROM for home use deals with the full gamut of healthcare topics, from AIDS to zygotes, although it doesn't include
any reference to alternative therapies. Sep 94

★★★ Mayo Clinic: The Total Heart 1.0, IVI Publishing, 612/686-0779, \$59.95. Cardiovascular health and related subjects are the topics of this medical CD-ROM for home use. Although it makes liberal use of drawings, photographs, and animations, video sequences would have been more effective. Sep 94

Medical HouseCall 1.0, Applied Medical Informatics, 801/464-6200, \$99.95. Interactive medical guide is a painless way for people to learn about diseases, tests, and therapies. Although it's easy to use and interesting, some of the medical images were incorrectly labeled. Feb 95

\*\*\* MusicTime 2.0, Passport Designs, 415/
726-0280, \$149 to \$249. Music-notation program is geared for hobbyists and students. If your needs aren't complex, it may fit the bill, at a great price. Oct 94

\*\*\* Performer 5.02, Mark of the Unicorn, 617/576-2760, \$495. A colorful, redesigned interface and improved sheet-music view are part of this MIDI recording program's most worthwhile overhaul in years. If you like the sheet-music view, this is the product to buy.

\*\*\* Practica Musica 3.0, Ars Nova Software, 206/889-0927, \$140. Music-teaching program, with emphasis on sight-reading and ear-training techniques, shines as a smart, infinitely patient personal music coach in the classroom. Jap 95

\*\* SAM-CD, Scientific American Medicine, 212/754-0550, \$395. Despite a few shortcomings, this medical reference work—a popular series of publications covering topics in clinical medicine—should prove a worthwhile addition to any medical library. Sep 94

\*\*\* Vision 2.08, Opcode Systems, 415/856-3333, \$495. MIDI program's list of exclusive, creativity-slanted features, such as endless count off, scrubbing (which lets you hear the music as you drag across it), and subsequences, give the program a usability edge. Mar 95 \*\*\* WIIIMaker 5.0, Nolo Press, 510/549-1976, \$69.95. Legal software quickly and easily automates the creation of wills, health-care directives and proxies, and final-arrangements documents. It offers excelent supporting explanations and background. Jun 94

#### WRITING TOOLS

\*\*\*

Bookends Pro 3.1, Westing Software, 415/435-9343, \$129. Comprehensive database program catalogs and stores all of your reference material—actual quotes as well as citations. It's a useful tool that researchers will appreciate. Mar 95

\*\* Grammatik 6 for Macintosh, Word-Perfect Corp., 801/225-5000, \$49.95. The low price, pleasant interface, and improved accuracy of this grammar checker make it worthwhile for a large number of quality-driven writers. It still misses some errors. Feb 95

\*\*\* MacWrite Pro 1.5 (1.5 v2), Claris Corp., 408/727-8227, \$249. The clean, uncluttered interface of this word processor is still one of its assets. This upgrade adds support for AppleScript and more. May 94 \*\* Microsoft Word 6.0, Microsoft Corp., 206/882-8080, \$329. If you can put this word

206/882-8080, \$329. If you can put this word processor's new features—including cross-referencing, AutoText, automatic numbering, macros and more—to work and you have a Quadra 650 or faster Mac, take the plunge. If you have a slower 68040 Mac, think twice; and if you have a 68030 Mac, don't even think about it. Feb 95

\*\* Nisus Writer 4.0, Nisus Software, 619/ 481-1477, \$495. In a few specialized areas—such as mixing English and non-Romance languages, this word processing program is unmatched. However, for some high-end uses, such as table creation and editing, it's a poor choice. Mar 95

\*\*\* OmniPage Professional 5.0, Caere Corp., 408/395-7000, \$695. In a historic first for OCR, this Power Macintosh software has an accuracy of 100 percent on good text samples. It does still make occasional baffling minor errors on real-world documents. Nov 94

★ The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300 ext.7370, \$895. CD-ROM dictionary contains half a million words, but the flaws, omissions, and unreliability are unbearable. Apr 94

\*\*\* Random House Unabridged Dictionary, Random House Electronic Publishing, 212/572-2600, \$179. Dictionary on CD-ROM works within any program and is good at guessing misspelled words. Although some functions don't work reliably, the quality and design of the software are good. May 94

\*\* TextBridge 2.0, Xerox Imaging Systems, 508/977-2000, \$99. Optical character recognition software is impressive on good documents and can be trained and automated. You won't find that anywhere else at this price. Sep 94

\*\*\* WriteNow 4.0.1, WordStar International, 617/494-1200, \$119.95. Tidy word processor's conservative use of memory (the application fits into a dainty 600K partition) and graceful interface will continue to win it fans. Jun 94

\*\*\* Writing Coach 1.0, WritePlace Software, 503/484-6380, \$89. If you'd like help with your writing, this writing-skills tutorial could be a great investment. Skillfully worded worksheets assist with planning, organizing, and revising. Dec 94

#### **Hardware**

#### INPUT DEVICES

★★★ DrawingSlate, CalComp Digitizer Division, 714/821-2000, \$395. Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-operated stylus is a bit heavy. Jun 94 ★★★ Ear Phone Streamline AV, Jabra Corp., 619/622-0764, \$169. As a hands-free telephony tool—and as a replacement for the Apple PlainTalk microphone—this telephone/speech-recognition earpiece is a winner. Its biggest drawback is that you can't hear other Mac sounds when it's plugged in. Jul 94 ◆

\*\*\* FlightStick Pro for Macintosh, CH

**Products, 619/598-2518, \$129.95.** The authentic look and feel of this joystick, along with well-conceived software, make it a nearly perfect desktop pilot's companion. Dec 94

\*\*\* Mac Keyboard Deluxe, MicroSpeed, 510/490-1403, \$125. If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. Nov 94

★★★ Mouse Deluxe Mac, MicroSpeed, 510/ 490-1403, \$69. The extra buttons of this mouse offer several features that Apple's mouse doesn't match, but its shape may not suit everyone's taste. Mar 95

\*\*\* Wacom UD-1212R, Wacom Technology Corp., 206/750-8882, \$749. Graphics tablet with pressure-sensitive stylus is easy to use and highly customizable, though it's incompatible with AppleTalk and AppleTalk Remote. May 94

#### MISCELLANEOUS HARDWARE

\*\*\* AirNote 1.0, Notable Technologies, 510/208-4400, \$349. Remote-messaging service lets you originate alphanumeric paging messages from your computer. It's a handy way to get into paging. Dec 94

\*\* Apple PCMCIA Expansion Module, Apple Computer, 408/996-1010, \$219. Wellintegrated, well-designed unit offers 500-series users an efficient and easy albeit expensive way to add features to their PowerBooks. If you can overlook the early-adopter prices (a big if), the PC Cards are great expansion options lightweight, low-power, and high-performance. Mar 95

★★ G-Vox, Lyrrus, 215/922-0880, \$399. Hardware-software guitar-instruction package lets your Mac "hear" the notes you play on your guitar. Although the hardware works well, the software has some basic problems and doesn't live up to the hardware. Apr 94

★★★ IX-4015 Color Image Scanner, Canon Computer Systems, 714/438-3000, \$1169. The price of this color flatbed scanner is competitive, and its speed and excellent bundled software make it easy to use and a good choice for the small office. Jul 94

★★ Macintosh TV, Apple Computer, 408/996-1010, \$2079. As a computer, this combination computer-television-CD player is sleek but slow. You can get faster performance and better expandability from several less-expensive Performa models. Apr 94

★★★ MultiSpin 4Xe, NEC Technologies, 708/860-9500, \$515. With its competitive price, free tech support, and two-year warranty, this quad-speed CD-ROM player is ready to race. Feb 95

\*\*\*
Photo Engine, Radius, 408/541-6100, \$1099. Photoshop-acceleration hardware's suite of four 66MHz 32-bit DSP chips offers sufficient processing power to speed up 25 Photoshop functions on the most sophisticated systems, including Power Macs. Feb 95

\*\*\*

SCSI Sentry, APS Technologies, 816/
483-6100, \$99. Although the price of this terminator
may seem steep, this device may well be the cure for SCSI
woes. Our reviewer heartily recommends it. Sep 94

\*\*\*
TurboDialer, Micromachines, 818/
901-1700, \$69.95. Automatic telephone dialer is a wellexecuted product, except for occasional computer noise that
seeps into phone conversations. Jul 94

\*\*\*
Vivace, Coda Music Technology, 612/
937-9611, \$2295. As an intelligent and endlessly patient accompanist, this music study system for wind instruments may be the best thing that's happened to learning wind literature since the metronome. Jan 95

\*\*\*
Yamaha YST-M10 Powered Monitor
Speakers, Yamaha, 714/522-9240, \$149.95.
Powered speakers have a good balanced sound and a great
volume range at an outstanding price. Apr 94

#### MODEMS/NETWORK HARDWARE

★★ Cooperative Adapter, Photonics Corp., 408/955-7930, \$349. The high cost of each unit, the limitations and restrictions inherent in diffuse infrared, and the low cost of traditional LocalTalk make this infrared network interface an expensive niche product. Dec 94

\*\*\* Cypress PhonePro 1.2 (1.5), Cypress Research Corp., 408/752-2700, \$349 to \$950. By improving its integration with FaxPro and with PowerTalk and PowerShare, this powerful telephony software has greatly extended its business scope. May 94

★★★ DaynaPort Pocket SCSI/Link, Dayna Communications, 801/269-7200, \$299 to \$369. Inexpensive, lightweight SCSI-to-Ethernet connector works with both desktop Macs and PowerBooks and can use the Mac's ADB port as a power source. Nov 94

\*\*\*\*

EtherWave, Farallon Computing, 510/814-5000, \$129. Instead of providing only one 10BaseT twisted-pair jack, this Ethernet transceiver includes a second jack that lets you daisy-chain to another device through an additional 10BaseT line. May 94

★★★ FastSwitch 10, Grand Junction Networks, 510/252-0726, \$6250. Switched Ethernet hub is a great solution for networks that handle large amounts of data traded peer-to-peer, but if your network consists of E-mail and a file server, you probably won't see much benefit in stepping up to switched Ethernet. Dec 94

★★★ OneWorld Fax, Global Village Communication, 415/390-8200, \$999. Easy-to-use network fax product lets an office share fax-sending resources without dedicating a hard drive and CPU; however, it can't receive faxes and can't queue more than one fax document at a time from a single CPU. Aug 94

★★★ Pocket EtherTalk Adapter, Xircom, 818/ 878-7600, \$349 to 399. All-in-one SCSI-to-Ethernet connector is lightweight and works with desktop Macs and PowerBooks. Nov 94

★★★ PowerPort Mercury/PB 500 Series, Global Village Communication, 415/390-8200, \$399. Top-notch fax modem is capable of exemplary fax and data communications performance. Nov 94

★★★ Spectra-Com P192mx, Bay Connection, 408/270-8070, \$199.95. If you must have absolute portability and AC power isn't available, this pocket data/fax modem can do the job. It's not that much smaller than a regular desktop modem, however. Oct 94

\*\*\* SupraFaxModem 288, Supra Corp., 503/967-2410, \$329.95. This 28,800-bps fax modem is a very good performer, and the price isn't terribly steep. Combined with fast, stable fax software and a good terminal program, it's hard to beat. Aug 94

\*\*\* Watermark Message Central 2.0.2, High Tide Software, 510/704-9927, \$499. If you're willing to put in a lot of effort, you'll find this highly sophisticated voice-mail system supremely flexible. It includes a specially modified modem with voice chip, as well as fax software and telecommunications software. Jul 94

#### PRINTERS

★★ Brother HJ-400, Brother International, 908/356-8880, \$369. Compact, 360-dpi ink-jet printer is fairly slow and does not allow background printing. Some large files require additional application memory to print correctly. May 94

★★★ Color StyleWriter Pro, Apple Computer, 408/996-1010, \$629. Color printer represents one of the best values in the inexpensive color-printing market. It's fast, produces nice-looking output, and has some good features, including a great way of handling color ink cartridges. Sep 94

\*\*\* HP LaserJet 4ML, Hewlett-Packard, 800/752-0900, \$1279. Primarily for those of you who use a PC or work in a small, mixed-platform environment, this energy-efficient laser printer offers automatic port and language switching, and is a good buy. Its advanced PC features may not be worthwhile for those who use Macs only. May 94

\*\*\* LaserWriter 16/600 PS, Apple Computer, 408/996-1010, \$2399. If speed is what you need, this fine printer is it. The price is reasonable, but for the best printout quality look for a higher-dpi printer. Mar 95

\*\*\* LaserWriter Select 360, Apple
Computer, 408/996-1010, \$1599. Low-cost, highperformance, 10-ppm printer is perfect for small LocalTalk
or mixed networks. For bigger networks, consider buying
more than one; they're more cost-effective than a 20-ppm
printer. Apr 94

★★ Notebook Printer II, Citizen America, 310/ 453-0614, \$399. If weight and size are your biggest concerns in choosing a portable printer, and you print primarily in black-and-white, this thermal-fusion printer may be a good choice. If speed is at all an issue, however, other options may be preferable. Jun 94

Personal LaserWriter 320, Apple Computer, 408/996-1010, \$959. If you've been holding out for a high-quality personal laser printer that's fast enough to share over LocalTalk, the small inconveniences of this 300-dpi printer are easily outweighed by its low price, good speed, and PostScript Level 2 support. May 94

\*\*\* PowerPrint 2.5, GDT Softworks, 604/
291-9121, \$149. Ingenious hardware-software combo
lets you print from your Mac to almost any PC printer. It
supports over 1000 printers, ranging from aging dot matrix
models to the newer color ink-jet and laser printers. Sep 94

\*\* PrimeraPro, Fargo Electronics, 612/
941-9470, \$1895. The photo-realistic output of this
thermal-wax and dye-sublimation printer beats that of any
other printer in the price range. But with expensive
consumables and slow print time, it's best suited for routine
thermal-wax use and occasional dye-sub work. Jan 95

\*\*\* P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, \$449.95. Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. Sep 94

★★ QMS ColorScript Laser 1000, QMS, 205/ 633-4300, \$7999. Color laser printer succeeds in combining the versatility of monochrome laser printing with attention-getting color, but if you don't need to chase rainbows right away, you might wait and see if competition drives capabilities up. Jul 94

\*\*\* Silentwriter 640, NEC Technologies, 508/264-8000, \$825. With 3MB of RAM, PostScript Level 2 support, and a 6-ppm engine, this printer is a capable performer. Generally, it represents hassle-free printing, but it doesn't handle single sheets of paper well. Jun 94

\*\*\* Smart Label Printer Pro, Seiko Instruments, 408/922-5900, \$299.95. If you need to print only a few labels at a time, this label printer may be an expensive but good choice. May 94 continues

# **Star Ratings**

#### SYSTEMS/STORAGE

\*\*\* Alacrity PM 6100, KS Labs, 614/374-5665, \$165. Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's entry-level Power Mac. Oct 94

\*\*\* Brainstorm Accelerator for the Macintosh SE, Brainstorm Products, 415/988-2900, \$199. Your SE will never be a Power Mac or even a lisi, but if your budget won't buy a new Mac, you can't do better than this accelerator, which pushes an SE's speed to close to a Classic II's in overall performance. Mar 95

★★★ Conley SR2 RAID System, Conley Corp., 212/682-0162, \$25,335. While RAID technology is typically praised for its fault-tolerance rather than its speed, this high-performance storage system proves that you can have both. For critical tasks requiring redundancy and round-the-clock operation, this is one of the best Mac RAID systems shipping. Sep 94

\*\*\* EtherDock, E-Machines, 408/541-6100, \$699. Heavy-duty Duo docking option is equipped with a full set of 11 ports, including an Ethernet port. The locking mechanism is alarmingly wobbly—although reliable enough to ensure a good connection. May 94

\*\*\* Joule System, La Cie, 503/520-9000, price varies by component. Plug-and-play tower lets you stack drives—including hard drives, removable media, and other modules—atop a base unit, making it easy to buy extra storage or swap modules with other Joule towers. Joule drive prices are generally slightly higher than for comparable drives, however. Feb 95

\*\*\*

LC 575, Apple Computer, 408/9961010, \$1699. For students and small-business
professionals who want high power and the convenience of
having everything integrated into one case, this 33MHz
68040 system is a good choice. Jun 94

Newton MessagePad 110, Apple Computer, 408/996-1010, \$599. This is the personal digital assistant that Apple should have shipped in August 1993, with improved handwriting recognition, including deferred and letter-by-letter recognition. It also has more memory, longer battery life, and a more efficient design. Aug 94

★★★ OrangePC Model 200 Series, Orange Micro, 714/779-2772, \$1139 to \$3237. If your goal is to get a Macintosh that runs Windows as fast as a PC, you can't get there from here. If your goal is to get business-level performance for day-in, day-out use, these PC coprocessor cards are probably your best choice. Aug 94 ❖

★★★ PLI Infinity 270 Turbo, PLI, 510/657-2211, \$651. This 270MB SyQuest drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives. Sep 94

★★ PowerBook 150, Apple Computer, 408/ 996-1010, \$1449. Fast, lightweight portable is minimalist in the extreme, with no video-out, ADB, Ethernet, or microphone. Unfortunately, the price is less minimalist, and most budget-conscious shoppers would be better off buying a used or discontinued model. Dec 94

★★★ PowerBook 540c, Apple Computer, 408/996-1010, \$4839. The prestige PowerBook du jour, this sleek, curvy and futuristic-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. Oct 94

\*\*\*
PowerBook Duo 280c, Apple Computer, 408/996-1010, \$3759. If you travel a lot, this notebook computer is hands down the best Mac to get.

It offers close to the power of a Quadra 650 in a subnotebook.

★★ PowerBook Duo Dock II, Apple Computer, 408/996-1010, \$969. Apple has added Ethernet to this full-featured docking station, but installing NuBus cards is still absurdly difficult. If you don't need NuBus expansion, consider other options. Oct 94

Power Macintosh 6100/60, Apple Computer, 408/996-1010, base model \$1819. Given its price and performance, this Power Macintosh is hard to resist. When developers offer in PowerPC format the software that most business users run daily, this should be a system that will give you power to spare. Jun 94 3 \*\*\*\* Power Macintosh 7100/66, Apple Computer, 408/996-1010, \$2899. Midrange Power

Mac makes an outstanding workstation whose power should last for several years. The price is nothing to take lightly, but this system delivers every dollar's worth. Aug 94 
\*\*\* Power Macintosh 8100/80, Apple Computer, 408/996-1010, \$4249. While this system doesn't quite offer the excellent price/performance ratio of the other available Power Macs, you should consider it if

based computing. Aug 94 

\*\*\* Power Macintosh 8100/110, Apple Computer, 408/996-1010, \$6379. High-end users who have invested heavily in NuBus cards can protect their investment with this top-of-the-line Power Mac. Mar 95

you're a high-end user moving your work over to RISC-

Power Macintosh Upgrade Card, Apple Computer, 408/996-1010, \$699. Current 33MHz 040 machines will get the best bang for the buck with this card, which is a less expensive upgrade path than a standard motherboard replacement. However, other Macs won't realize as much of a performance gain. Oct 94

\*\*\* Quadra 630, Apple Computer, 408/ 996-1010, \$1279. Fast, inexpensive, expandable 33MHZ 68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. Nov 94

\*\*\* SCSI MicroDock, Newer Technology, 316/685-4904, \$175. Tiny Duo docking station is just under 41/2 ounces and barely 5 inches long. It adds only an ADB port and a SCSI port—but both are useful. May 94

\*\*\* SledgeHammer2000FMF, FWB, 415/
474-8055, \$3179. RAID drive is both fast and inexpensive. Although it can be a bit noisy when accessing data, it's a good deal. Apr 94

#### VIDEO/DISPLAY

\*\*\* Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, \$1579. 24-bit accelerated graphics card offers a satisfactory price/performance ratio, although it can't switch resolutions from the keyboard. Oct 94

★★★★ Apple Multiple Scan 15 Display, Apple Computer, 408/996-1010, \$509. The tridot tube of this 15-inch monitor provides a sharp and accurate image, but reflects some glare. The built-in stereo speakers reproduce sound nicely and are a benefit for CD-ROM users.

\$595. Small, unobtrusive desktop video camera has a flexible gooseneck for positioning. Dec 94

\*\*\* Intellicolor Display/20, Radius, 408/ 434-1010, \$2399. Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellicolor software, which lets you control the settings of your display, doesn't offer much added value. Apr 94

★★★ L-TV Portable, Focus Enhancements, 617/938-8088, \$299. Sturdy, inexpensive, external TV-converter plugs into your Mac and converts video output to NTSC. It provided a crisp, clean image, but mild flickering and conspicuous shimmers were persistent. Aug 94 ★★★ L-TV Pro NuBus, Focus Enhancements, 617/938-8088, \$399.99. NuBus card converts your Mac's RGB video signal to NTSC so you can use your Mac with a TV or VCR. It supports a wide range of Macs, but the image has some flicker and distortion, despite flicker-filtering software. Aug 94

\*\*\* Multiscan 15sf, Sony Computer Peripheral Products, 408/432-1090, \$569.95.

Trinitron monitor has a flat screen that displays sharp, bright, and accurate images. With good antiglare coating and adjustable image tilt, it's worth looking at. Feb 95

\*\*\* MultiSync 3V Monitor, NEC Technologies, 708/860-9500, \$495. With a bright display and great image quality, this monitor delivers a fine picture at a moderate price. Feb 95

\*\*\* Panelight ZX, Panelight Display Systems, 415/772-5800, \$3995 to \$4695. LCD panel offers vivid images at a comparatively low price. It's a great choice for presenters. Mar 95

\*\*\* The Presenter Plus Mac/PC, Consumer Technology Northwest, 503/643-1662, \$429.

Small, external TV-converter supports output to television from most Macs with built-in video. It does a barely passable iop of providing a stable image. Aug 94

★★★ QA-350 LCD, Sharp Electronics Corp., 800/237-4277, \$2495. At less than half the cost of a typical active matrix LCD panel, this passive matrix projection panel offers an economical alternative for presenters who don't need multimedia capability. Jul 94

\*\*\* QuickCam, Connectix Corp., 415/571-5100, \$149.95. For as little as \$99 (street price), this tiny, fun, easy-to-use, digital video camera lets users experiment with video input for making QuickTime movies or capturing still images. Mar 95

\*\*\* Radius LeMansGT, Radius, 408/434-1010, \$2499. Fast, 24-bit accelerated graphics card has automatic 30-bit CLUT calibration and can switch resolution on the fly via a pop-up menu. Oct 94

\*\* RasterOps Horizon 24, RasterOps, 408/ 562-4200, \$1999. This 13-inch 24-bit accelerated graphics card is slower than anticipated and overpriced. The ROM can, however, be upgraded via software. Oct 94

\*\*\* Simply TV, E-Machines, 408/541-6100, \$439. Easy-to-install video card plugs snugly into a PDS slot, and allows you to use your Mac with a television for display. The image is impressively flicker-free, but the resolution is limited to 256 colors. Aug 94

\*\*\* SuperMac Spectrum Power•1152, SuperMac, 408/541-6100, \$1399. Fast, relatively inexpensive, 24-bit accelerated graphics card can switch resolutions from the keyboard and offers zoom and pan options. Oct 94

★★ Tornado Graphics Card, Mirror Technologies, 612/832-5622, \$699. Inexpensive 24-bit accelerated graphics card has zoom and pan options but is relatively slow. Oct 94 m

# streetwise Shopper

#### SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

#### Selected and edited by Charles Barrett

The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in *Macworld's Reviews* (products rated \*\* or lower are not eligible for inclusion), have been selected as an Editors' Choice, or have won a World-Class award. In some cases, the editorial evaluation quoted is for an earlier product version. The Symbol indicates that the product is Power Mac related. Except where otherwise indicated, prices given are suggested retail prices.

When placing an order, please mention that you saw the offer in *Macworld*. Should any problems arise, contact the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the Streetwise Shopper editor with particulars.

#### BUNDLES

Apple Newton MessagePad 120 + Equate 1.0 Holosoft is offering its \$99 Newton spreadsheet application, which exchanges files with Microsoft Excel, for \$59.95 to customers who purchase a \$599 (1MB) or \$699 (2MB) MessagePad 120 through a Holosoft dealer. Both MessagePads come bundled with Notion: The Newton List Manager; the 2MB configuration also includes Intuit's Pocket Quicken for Newton, plus a month of Apple's eWorld online service and Pen Tekk Software's PowerNews. Call 408/748-9648 for nearest Holosoft reseller. Offer expires 4/15/95.

artWorks 1.0 + Clip Art + TrueType Fonts Deneba Software is including 8000 vector-based clip-art images and 500 text, display, and novelty typefaces on CD-ROM with its \$49.95 artWorks 24-bit paint and draw program (Jun 93 \*\*\*). Call 305/596-5644 for more information.

HammerDLT 20G + © Retrospect 2.1 FWB is including a DLT-compatible version of Dantz's \$249 backup and archiving program (Sept 93 \*\*\*\* for Retrospect 2.0) with its \$5499 HammerDLT 20G digital linear tape drive, which has a sustained data-transfer rate of over 140MB per minute. Call 415/474-8055 for more information.

○ Kai's Power Tools 2.1 + KPT Bryce 1.0 HSC Software is offering a \$299 bundle consisting of its \$199 collection of plug-in extensions (May 94 \*\*\*\* for Kai's Power Tools 2.0a) for such applications as Adobe Photoshop and Fractal Design Painter, plus its \$199, 3-D landscaperendering program (Dec 94 \*\*\*\*). Also, MicroFrontier's \$149.95 Color It 2.3, a 32-bit paint and image-editing application (Apr 93 \*\*\* for version 2.0.1), is being included with Kai's Power Tools. Available through select mail order. Call 805/566-6200 for more information. Offer good through at least 6/30/95

**LabSuite** National Instruments is offering its \$1995 Lab-View general-purpose programming tool and \$695 HiQ object-based numerical-analysis and data-visualization software combined in one package for \$2395. Call 800/433-3488 for more information.

Street Atlas USA 2.0 + Select Phone + Capitol Hill MacWarehouse is offering a bundle for \$79.95 that consists of DeLorme Mapping's \$169 street-level map database of the entire United States on a single CD-ROM (Oct 94 \* \* \*); Pro CD's \$159.95 Select Phone utility, which contains 10,000 phone books on 5 CD-ROMs; and Mindscape's \$19.95 interactive tour of Capitol Hill (BND 0485), to customers who have purchased any CD-ROM drive from the company during the past 90 days. Bundle is also available, without the purchase of a drive, for \$199.95 (BFE 0015). Call 800/255-6227 to order. Offer expires 4/30/95.

#### COMPETITIVE UPGRADES

Adobe Dimensions 2.0 Adobe Systems is offering registered users of Adobe Illustrator 5.5 or Photoshop 3.0 this \$199, 3-D effects software (Apr 95 \*\*\*\*) for \$99. Call 800/521-1976 to order. Offer expires 3/31/95.

**FullWrite 2.0.2** Akimbo Systems is offering this \$395 word processor (Apr 95 \*\*\* for version 2.0.1) for \$120 to registered users of other word processors. Call 800/375-6515 to order or for more information.

Canvas 3.5 Deneba Software is offering this \$339 draw program (Jan 94 \*\*\* for the 680X0 version), which includes 10,000 clip-art images and 2000 fonts on CD-ROM, to registered users of any Macintosh graphics program, for \$149.95. Call 800/733-6322 for more information.

○ Data Desk 4.2 Data Description is offering this \$595 data-analysis package (Oct 93 "The Statistical Difference" Editors' Choice for version 4.1) to Abacus Concepts' MacSpin users for \$297. Data Desk combines traditional statistics functions with dynamic data display and manipulation. It includes a full range of statistical plots and procedures. Free demo disk available. Call 800/573-5121 for more information.

• FolderBolt Pro 1.0; NightWatch II Registered users of DiskLock 3.0, UltraSecure, Ultrashield, Fileguard, and Empower can purchase Kent Marsh's \$129.95 FolderBolt integrated security software (Jun 92 \*\*\*\* for FolderBolt 1.02) for \$55 or can buy it bundled with the company's \$159.95 NightWatch II hard-disk-security software (Nov 92 \*\*\* for version 2.0.1b) for \$79.95. Call 800/325-3587 for more information.

○ VivaPress Professional 1.5 Interpress Technologies is offering this \$895 page-layout application to registered users of PageMaker or QuarkXPress for \$295. The AgfaType CD-ROM, which offers instant purchasing access to Agfa and Adobe's PostScript type libraries, is also provided. A coupon valued at up to \$429 is included, offering any volume from Agfa's type library, plus a purchase price of \$35 for Agfa's

TypeChart utility for creating customized type-specimen books. VivaPress Pro incorporates graphics functions, imposition, memory-saving Alias technology, and filters for editing images from FreeHand and Illustrator. A run-time version is available for service bureaus serving VivaPress users. Call 212/245-2700 for more information. Offer good through at least 3/31/95.

#### SPECIAL DISCOUNTS/OFFERS/REBATES

Adobe ScreenReady Adobe Systems is offering this \$199 graphics utility package, which consists of a Quick-Draw-based driver and a PostScript application, for an introductory price of \$99. ScreenReady simplifies and speeds the process of readying files from design and page-layout applications for use in multimedia authoring programs by automatically converting images into PICT format. Call 800/521-1976 for more information. Offer expires 4/30/95.

AppGen 1.0 Pinehill Software is offering a special introductory price of \$9.95 (\$59.95 with bar-code capability) for this \$99 (\$149 with bar coding) data-entry-application generator for Apple Newton MessagePads. Price includes manual and online support (AOL, CompuServe, AppleLink, and eWorld). Call 508/548-4470 (Pinehill on AOL and AppleLink; 70511,2355 on CompuServe). Offer expires 3/31/95.

HP ScanJet Ilcx Hewlett-Packard is offering a \$150 rebate to those who purchase its \$1179 ScanJet Ilcx 24-bit color flatbed scanner (Nov 93 "Low-Cost Color Scanners" Editors' Choice for the Ilc) between 11/1/94 and 3/31/95 and send in a coupon available at their local dealer. Call 800/722-6538 for more information. Offer expires 3/31/95. Informed Designer Shana Corporation is offering its \$295 electronic-forms-design package, complete with electronic documentation and technical support, free of charge. Available on CD-ROM (includes interactive video tutorial), or floppy disks for a \$15 S&H charge, by calling 800/386-7244. Offer good through at least 5/31/95.

InTouch 2.5 Prairie Group is offering an introductory price of \$49.95 for this \$69.95 personal information manager desk accessory (Feb 93 \*\*\* for version 2.0.4), which it acquired from Advanced Software last June. Call 800/346-5392 for more information. Offer expires 4/15/95.

● Stuffit SpaceSaver 3.5 MacMall is offering this \$79.95 system enhancement from Aladdin Systems for \$19.99 to customers who purchase any other product from MacMall. SpaceSaver safely and automatically doubles disk space and allows for the use of files and applications without having to manually decompress them. Call 800/222-2808 to order. Offer expires 4/30/95.

SuperBridge 3.0 Sonic Systems is offering owners of Apple's free LaserWriter Bridge a \$99 credit toward the purchase of this \$249 utility, which links up to ten LocalTalk devices of any kind to a host network that uses extended protocols, Call 800/535-0725 for more information.



SPONSORED BY

IN ASSOCIATION WITH

NOVELL

HEWLETT

PACKARD

WCCO TALK 8.3.0

Microsoft<sup>\*</sup>

Lotus.

SPECIAL MANUFACTURER PAVILIONS

Apple Computer, Inc.

MINNEAPOLIS CONVENTION CENTER

#### **IT SHOWCASE**

**OPEN SYSTEMS NETWORK COMPUTING** WINDOWS ACCOUNTING

**NOTEBOOK COMPUTING** INTERNET CONNECTIVITY MAC-BASED COMPUTING HOME OFFICE

#### DIGITAL PREPRESS/PRINTING SHOWCASE

DESKTOP PUBLISHING **GRAPHIC DESIGN ELECTRONIC PREPRESS** ON DEMAND

MULTIMEDIA PRINTING BINDERY

CAREERS IN TECHNOLOGY. Presented in part by StarTribune

100 top companies are offering their best technical jobs to professionals in the Midwest. Admission is FREE.

See the complete guide to Careers In Technology in a Star Tribune special section Sunday, April 30 and in TCX on Friday, April 28.

#### SPECIAL KEYNOTE SPEAKER

Jim Buckley, President, Apple Computer

#### **FEATURED CONFERENCES**

48th Annual Information Systems Conference for the Association for Systems Management (ASM)

17th Annual Minnesota Joint Computer Conference (MJCC) with the Minnesota Software Association (MSA), Twin Cities ASM, Independent Computer Consultants Assoc. (ICCA), the Institute of Electrical & Electronic Engineers Computer Society (IEEE) and Assoc. of Computing Machinery (ACM)

Minnesota Society of CPA Information Technology Conference

**ADMISSION AT THE DOOR \$15/PERSON ADMISSION IS FREE TO CAREERS IN TECHNOLOGY** FOR INFORMATION CALL 612.894.8007 INTERNET: SBCGE@THE-LINK.COM SHOW HOURS 10 AM - 6 PM DAILY THE LINK. OFFICIAL INTERNET ACCESS PROVIDER.

E L H H R E N N

All event collateral designed and produced by CTS Creative Graphics

Advertiser Index
Say you saw it in Macworld. To purchase products advertised in this issue call the phone numbers below or use the reader service number for our FastFacts Product Information Card located after the product index.

Page No.		eader c. No.	Phone	Page No.		Reader Grvc. No.	Phone	Page No.	Advertiser	Reader Srvc. No.	Phone	
. 26	Aatrix Software	159	800/426-0854	30-31	Epson America	_	800/BUY-EPSON	42	Radius	_	-	
- 11	Adobe	231	800/521-1976	218-219	Express Direct	81	800/765-0020	82	RasterOps	124	800/344-TRUE	
212	Advanced Business Center	225	800/723-8262					100	Pools Core			
66	AEC Software	203	800/450-1982	138-139	Fujitsu	202	800/831-4094	168	Reply Corp.	===	_	
29	Agfa	43	800/685-4271									
40	Agfa	158	800/685-4271	68	Graphsoft	46	410/290-5114	88	Samsung Electronics			
14	Agio	-	800/688-2446						America, Inc.	198	800/933-4110	
204	Alliance Peripheral Systems	62	800/874-1428	47	HSC Software	5	805/566-6200	84	Seiko Instruments	93	800/888-0817	
165-166	America OnLine	-	800/827-6364					9	Specular International	41	800/433-7732	
124-125	American Power Conversion	72	800/788-2208	78	Insignia Solutions	68	800/848-7677	9	Specular international	41	000/433-7732	
12	Anthro		800/325-3841	49	Intuit	-	800/781-6999	209-210	Spin Peripherals	248	800/215-9200	
22-23	Apple Computer		_					20	SPSS INC.	85	800/457-8287	
90-91	Apple Computer	-	-	BC	Kensington Microware, Ltd.	_	800/535-4242	115	Statsoft	99	918/583-4149	
157	Apple Computer	-	-					113	Statsort	33	310/303-4143	
- 40				15-18	La Cie	52	800/999-1422	48	Strata/InstantReplay	114	800/869-6855	
194-195	BottomLine Distribution	63	800/622-8721	10.10	5.0		300,000 1122	160	Strictly Business			
				198-199	Mac Bargains	70	800/619-9091		Expo - Florida	_	_	
70	Canon Graphics Systems	110	800/OK-CANON	76	MacAcademy	106	800/527-1914					
145	CE Software, Inc.	170	800/523-7638	132-133	MacConnection	_	800/800-3333	180	Strictly Business			
151	CE Software, Inc.	171	800/523-7638	185-190	MacMall	131	800/222-2808		Expo - Minnesota	-	_	
192-193	ClubMac	96	800/ CLUB MAC	213	MacProducts	65	800/347-8751	191	SuperMicro	126	800/352-3415	
109	CompuServe	66	800/848-8199	86	Macromedia	86	800/326-2128	40	ASTRONOMY AND THE	040		
196-197	Computer Discount Warehouse	2	800/861-4CDW	202-203	MacWarehouse	150	800/255-6227	46	SyQuest	249	800/245-2278	
50	Connectix	192	800/950-5880	142	Macworld Active							
52	Connectix	191	800/950-5880		Buyer Days	_	_	39	Tektronix	143	800/835-6100	
72	Corel Corporation	78	800/836-3729	8	MediaMagic Solutions	103	800/SAY MAGIC	6-7	Texas Instruments	266	800/527-3500	
206-207	CRA Systems Inc.	20	800/375-9000	214	MegaHaus	245	800/786-1184	0-7	reads institutions	200	000/327-3300	
74	CTX International	38	909/595-6146	32	MicroNet Technology, Inc.	139	800/800-DISK	170A-170B	Texas Instruments	290	800/527-3500	
				IFC-1		-						
44	Dantz Development	26	800/225-4800	64	Motorola Modems	207	800/766-4883	215	The Mac Zone	71	800/436-0606	
146	DayStar Digital	7	800/532-7853					1725000				
24	Delphi	173	800/695-4005	2-3	NEC Technologies	15	800/NEC-INFO	164	Trinity Works	118	800/278-4944	
21	Deneba Software	57	800/733-6322	IBC	NEC Technologies	16	800/NEC-INFO					
194-195	DGR Technologies	63	800/622-8721	60	Nisus Software Inc.	123	800/647-8794	62	Umax	196	800/859-2728	
216	DigiCore	269	800/858-4622	13	nView Corp.	117	800/736-8439		10.000000000	10,55	was 4.505 (76.75)	
212	Digital Axis	83	800/747-7555	2000	2 2 72 7							
201	Direct Connections	121	800/572-4305	147	Performance Systems International	95	800/82-PSI82	80	Viking Components	233	800/338-2361	
208	Direct Tech	298	800/279-5520	27	Pinnacle Micro	115	800/553-7070					
				154	Pro CD	217	800/992-3766	FA FF	\MorelDoufout Comment		000/520 7020	
10	EA Research	53	800/681-6566	200	ProDirect	135	800/524-9952	54-55	WordPerfect Corporation	===	800/526-7820	
247	Educorp	157	800/843-9497									
14	Engineered Software	12	910/299-4843	53	QMS		800/392-7559	47	Xante Corporation	112	800/926-8839	

Product Index

A quick and easy product index from Macworld. Simply use this index to find the page or advertiser of the products which interest you. Then, use the reader service number for our FastFacts Product Information Card located on the following page.

Page No.	Advertiser	Reader Srvc. No.	Page No.		Reader Srvc. No.	Page No.		Reader Srvc. No.	Page No.	Advertiser	Re Srvi
SOFTV	ARE		44	Dantz Development	26	194-195	BottomLine Distribution	63	SERVIC	ES	
BUSINESS	Ane		78	Insignia Solutions	68	192-193	ClubMac	96	ON LINE		
26	Aatrix Software	159	1.5		2020	194-195	DGR Technologies	63	V. J. Carrier		
66	AEC Software	203	VERTICAL			201	Direct Connections	121	165-166	America OnLine	
49	Intuit	-	26	Aatrix Software	159	208	Direct Tech	298	157	Apple Computer	
IFC-1	Microsoft Corporation	_				138-139	Fujitsu	202	109	CompuServe	
115	Statsoft	99	WORD PROCES	SING		15-18	La Cie	52	24	Delphi	100
54-55	WordPerfect Corporation	-	60	Nisus Software Inc.	123	213	MacProducts	65			
			54-55	WordPerfect Corporation	-	214	MegaHaus	245	TRADESHOWS	/CONFERENCES	
CAD/CAM									160	Strictly Business	
14	Engineered Software	12	HARDW	ARE		32	MicroNet Technology, Inc.	139	100		
68	Graphsoft	46	BOARDS 10	EA Research	53	27	Pinnacle Micro	115		Expo - Florida	
CD DOM			82	RasterOps	124	200	ProDirect	135	180	Strictly Business	
CD ROM	Corel Corporation	78	168	Reply Corp.	12.4	191	SuperMicro	126		Expo - Minnesota	
247	Educorp	157	100			46	SyQuest	249			
154	2 20 C C C C C C C C C C C C C C C C C C	217	CD ROM			80	Viking Components	233	TRAINING		
151	110 00	2.17	247	Educorp	157				76	MacAcademy	
GRAPHICS/D	TP					INPUT DEVICE	S		ACCES		
11	Adobe	231	COMPUTER SY	STEMS		BC	Kensington Microware, Ltd.			SORIES	
72	Corel Corporation	78	22-23	Apple Computer	-		Wilcioware, Ltu.		FURNITURE		
21	Deneba Software	57	90-91	Apple Computer	-	MICROPROCES	SSOR		12	Anthro	
51	HSC Software	5	206-207	CRA Systems Inc.	20	164	Trinity Works	118	10		
86	Macromedia	86	218-219	Express Direct	81			107.7	MAIL	RDER	
9	Specular International	41	191	SuperMicro	126	MISCELLANEO	ous		212	Advanced Business	
48	Strata/InstantReplay	114				124-125	American Power			Center	
MISCELLANI	oue		DIGITIZERS/SC		40	50	Conversion	72	204	Alliance Peripheral	
WIISCELLAIN		103	29 40	Agfa Agfa	43 158	70	Canon Graphics Systems	110		Systems	
	Wicdawagic Columbia	100	212	Digital Axis	83	MODEMO			194-195	BottomLine Distribution	
MULTIMEDIA	4		62	Umax	196	MODEMS 64	Motorola Modems	207	192-193	ClubMac	
86	Macromedia	86	87		(45.7)	04	Wibtorola Wibdellis	207	196-197	Computer Discount	
142			DISPLAY			PRINTERS			2000	Warehouse	
	Buyer Days	S ===	206-207	CRA Systems Inc.	20	70	Canon Graphics Systems	110	194-195	DGR Technologies	
NETWORKIN	G		74	CTX International	38	30	Epson America	-	216	DigiCore	
145		170	212	Digital Axis	83	2-3	NEC Technologies	15	201	Direct Connections	
			IBC	NEC Technologies	16	53	QMS	-	9757023 HS20003		
ONLINE			13	nView Corp.	117	84	Seiko Instruments	93	208	Direct Tech	
147	Performance Systems International	95	88	Samsung Electronics America, Inc.	198	39	Tektronix	143	218-219	Express Direct	
				r individu, indi		170A-170B	Texas Instruments	290	198-199	Mac Bargains	
PERSONAL			EXPANSIONS/	JPGRADES		6-7	Texas Instruments	266	132-133	MacConnection	
49	Intuit	-	146	DayStar Digital	7	51	Xante Corporation	112	185-190	MacMall	
			164	Trinity Works	118				213	MacProducts	
STATISTICAL		1,000,000	80	Viking Components	233	SECURITY			Season Season	20090200 87	
20		85	FURNITURE			124-125	American Power Conversion	72	202-203	MacWarehouse	
115	Statsoft	99	14	Agio					214	MegaHaus	
UTILITIES						VIDEO			200	ProDirect	
151	CE Software, Inc.	171	HARD DISKS/S			52	Connectix	191	209-211	Spin Peripherals	
50		192	204	Alliance Peripheral Systems	62	- 20			215	The Mac Zone	



THE LARGEST AUTHORIZED FULL LINE MACINTOSH® MAIL-ORDER Verified lowest prices with over 2500 products on sale!

Warehouse

Sonv Multiscan 15sf Monitor



VividSpin

DOUBLE-SPEED D-ROM DRIVE



TelePort Gold II

14,400 bps Fax/Data Modem Includes software and on-line service connection files

by Global Village



# ervice guarantee!!

"We will deliver your order by 10:30am THE NEXT DAY or pay for your shipping!"\*

\*Limited to in-stock orders placed before 8pm (EST) not requiring configuration and delivered by FedEr\* to destinations within the contiguous U.S. (\*Next Day\* not available to certain rural areas.)

# Authorized for Macintosh® Performa®! Call about the NEW FASTER PowerMac™!



Authorized Catalog Reseller

**CALL TODAY FOR YOUR** FREE CATALOG!!

800-222-2808

WE HAVE THE LARGEST SELECTION OF APPLE \* PRODUCTS!!



# Asanté **Ethernet Cards**

MacCon + LC 10BaseT

.56999 Asanté Lite 10-BaseT

6999 #67644 MacCon LCTNIII 10BaseT/Thin

#67643

Cards compatible with LCII, LCIII, Performa 475, 550, 577, 578, 630, Quadra 605/630



MacInTax Federal 1994 **Final Version** #68431

Macintosh Action CD Pack

5 Super Macintosh® titles on 1 CD ! Plus

FREE Oceans Below CD





SvQuest Cartridaes

as low as

Overnight FedEx® Delivery by 10:30am!

\$3 Per Order



To Order, Call Toll Free PRIORITY CODE: D542MG14

00 • 222 • 2

**Call today** for your FREE Catalog!!

MBG

Fax: 310-222-5800

Customer Service: 800-560-6800

International Orders: 310-787-4500

### MacMall has it all!!

If you see a lower price not advertised in this magazine, please call us and we'll do our very best to BEAT that advertised price.

Mail: MacMall Order Dept., 2645 Maricopa St., Torrance, CA 90503-5144

### HP DeskJet 1200C/PS Printer

### HP's most powerful office printing



 OUUX3UUGpi black fext with Resolution technology a 300 dpi full color printing - up to 16.7 million colors • Up to 7ppm for black text, 1-2 ppm or color graphics • 4MB memo-scalable fonts for Macintosh\* and Windows • Color HP PCL 5 with 45 scalable text of the production of th typefaces for professional-looking text and graphics #61618 \$164999

Block Cartridge DeskJet 1200C \*25" #62083 | Magenta Cartridge DeskJet 1200C \*28" #62082 | Cyan Cartridge DeskJet 1200C \*28" #62084 | Yellow Cartridge DeskJet 1200C \*28" #62081

### **HP ScanJet Ilcx Scanner**

The high performance color/grayscale scanner that provides advanced features at a breakthrough price

 Superior image quality with 1600 dp. enhanced resolution; 400 dpi optical resolution

24 bit color allows you to scan over 16 million colo

 HP AccuPage for better text recognition
 Optional transparency adapter available #66369

Optional 50 page document feeder available

One-year HP Express Exchange Warranty for 24-hour replacement service

Includes Adobe Photoshop LE

# **HP ScanJet 3p Scanner**

HP's lowest cost, grayscale complete sca • 256 grayscale levels • Includes software for text/images scanning

and for making copies on your printer Add text, line art and photo to documents

 300 doi resolution, extendible to 1200doi · Compatible with Macintosh® or Windows

onus: Includes FREE Calera WordScan OCR Software

**Automatic Document Feeder** 

#66436 \$485 #66437 \$204<sup>99</sup> for HP SCANJET 3p Scanner

# **HP ScanJet IIp Scanner**

# CLOSEOUT SPECIAL Incredible bargain on high quality 300dpi

grayscale flatbed scanner from HP! New HP AccuPage 2.0 technology makes third party

OCR software even more accurate.1200dpi enhanced resolution and 300dpi optical resolution. Automatic exposure options to speed productivity. LIMITED SUPPLY!! #60124

### **HP DeskWriter 320 Printer**

The new HP DeskWriter 320 offers the highest quality output of any mobile printer

- 600x300dpi black printing on plain paper and Hewlett Packard exclusive Ret.
- Three ppm black print speed and up to 4 minutes

Three ppm black print special control of the per page color printing Low cost HP color kit for easy to add optional color, featureing Hewlett Packard's breakthrough ColorSmart Technology \$309 Compact, portable design fits neatly into any briefcase

DeskWriter 320 w/ Sheet Feeder

Transparency Adapter for Ilcx	#63585
DeskWriter 310/320 Battery	#60750
DeskWriter 310/320 Rapid Charger	#60751
DeskWriter 310/320 Carrying Case	#60752
DeskWriter 310/320 Sheet Feeder	#60749
Black Ink Cartridge for DeskWriter 310/320	#63511
Toner for LaserWriter II, LaserJet IID, III, IIID	#51071
Toner for LaserWriter Plus and LaserJet Plus	#61449
Toner for Per. LaserWriter LS, NT, NTR, LJ IIP	#1399
Toner for LaserWriter Pro, LJ 4, 4M, 4 Plus, 4M Plus	#60834
Black Cartridge for DeskWriter, DeskJet (1000 pages)	#60123
Tri Color Cartridge DeskWriter/DeskJet	#3344
Color Printing Kit for 310/320/540	#62565
Toner for LaserJet IIISi, 4Si, 4SiMx119"	#3638
Toner for Laser Writer 4MV154**	#67363



# **HP LaserJet 4MP Printer**

Outstanding quality personal 600-dpi laser printing for Macintosh®

- True 600dpi resolution utilizing Resolution
- Enhancement technology and microfine tone

  RISC processor delivers fast 4ppm
- 35 Adobe scalable fonts
- 6MB RAM standard memory
   LocalTalk\*, HP Bi-Tronics parallel and serial interfaces standard
- Automatic language and I/O switching for easy, unattended operation in multiple-platform enviror
   Flat paper path handles media up to 42-pound thickness and as small as a 3"x5" card
- Powersave mode

Macintosh® and Windows PC compatible #62758

### CardShopCD/Notecards

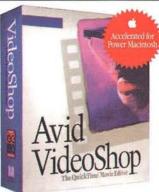
\*with purchase of any inkjet printer only

### **HP LaserJet 4ML Printer**

- HP Resolution Enhancement technology and microfine toner produce the best 300 dpi output available
- · Postscript Level 2
- 35 Adobe™ scalable fonts
   RISC-based Intel 80960KA processor

4MB RAM standard memory
 Macintosh\* and Windows PC compatible
#61793

\$ 1029



# VideoShop® 3.0

# The video software anyone can use.

VideoShop® 3.0 makes it easier than ever for you to create high quality digital movies and videotapes that include stunning effects. To create a movie, simply drop media clips into the sequencer for powerful cut, copy and paste editing. Polish your movies with over 200 amazing digital effects, including Morph. Unique composing and layout features allow you to layer unlimited video and graphics tracks. With VideoShop®, you can position, re-size and "fly" clips across a path. VideoShop® also includes sound mixing and audio effects. Create antialiased titles with automatic scrolling. Avid is the industry leader that Hollywood professionals turn to. With over 300,000 copies already sold, why wait? PowerMac" Accelerated. Includes royalty free footage. Requires: Color Mac",

4MB and 40MB drive and System 7.0 or greater.



# **PaperPort**™

Turn your Mac™ Into A Fax, Copy and Filing Machine

PaperPort™ fits anywhere and goes anyplace!

Designed to sit between your keyboard and monitor PaperPort™ fits on the most crowded desktops! At 12.5″x3″ you can take it anywhere and it fits in nearly any computer bag.

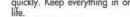
Faster than speeding bullet!

Feed a business letter into PaperPort™ and it spits it back at you and displays the digital page on your screen in less than 6 seconds. Easier to use than the Mac" itself!

PaperPort™ uses exclusive paper driven™ technology - There's not even an on/off switch - Just touch paper to PaperPort™ and it takes over and does the rest automatically. Handles virtually any type of

paper! Your Mac™ can fax!

Never have to leave your desk to send paper again.



File your paper on your Mac™!

The powerful search software allows you to find anything quickly. Keep everything in one place and simplify your

Your Mac™ can be a copy machine!

That's right, scan a page, send it to your printer, and you've just made a copy. And you've just done it right from your desk.

There's so much more!

VISIONEER

PaperPort™ storage and communications "command center" has links to printers, fax and OCR!

#66433



OCR software included

### VISTA-S8

6400 dpi, High Speed, Single Speed, Color Scanner

The new Vista-S8 with its UltraView® Technology produces smoother interpolation for sharp, clear images.
Plus Umax's own. MagicMatch color management technology provides accurate and vivid colors.

- Supports up to 8.5"x11.7" (reflective) and 8.5"x10" (transparency)
   SCS1 2 interface with cable included
   Scans black and white, color and line art
   Single pass with single cold lamp technology
   Optical resolution of 800x400dpi

- Descreening, auto-density adjustment, filtering functions
   TWAIN and ASPI compliant
- Includes Photoshop LE and OmniPage Direct





\$86999

# POWERLOOK \$\$\$\$ It Beats Other Flatbed Scanners...

Like a Drum.

1200 dpi Color Scanner

- 3 Obit scanning mode recognizes more than one billion colors and 1,024 shades of gray (10-bits per pixel); true 30-bit output!)

  Single pass CD imager captures 30-bit color without the need for prisms, filters or color lamps. This gives you superior images with outstanding reliability
  Includes full version Adobe" Photoshop 3.0 and Kan's Power Tools SE

  2400 dpi maximum scanning resolution (interpolated), with 1200x600 optical

  Supports color, grayscale, halftone, line art modes

  8 built-in SCSI-II interface

  8 cooling from 1% to 400% in 1% increments

  #66132





PowerLook 1200x600

w/o transparency adapter and without software

#68859 \$2499<sup>99</sup>

# EXTREMELY SHOCK-RESISTANT



The Nomai Family of SyQuest™ compatible REMOVABLE CARTRIDGES provides the optimum in data storage performance. Nomai cartridges are the most shock-resistant cartridges available on the market today. In a recent MacUser review, Senior Editor Mark Frost said, "We mailed 'em, cooked 'em, magnetized 'em and dropped 'em - and these removable cartridges came back for more... None of the cartridge suffered any data loss!" This TREMENDOUS SHOCK-RESISTANCE is obtained by DLC (Diamond Like

Catalog). DLC protects against airborne particles which results in a long-life cartridge you can trust.

PREFORMATTED and backed by a 5 YEAR WARRANTY, Nomai offers unparalleled dependability and performance at an

UNBEATABLE PRICE.

44MB

**88MB** 





# Canvas 3.5

Cross-Platform Graphics Powerhouse

Now includes a bonus CD-ROM with 10,000 quality clip art image and 2,000 professional TrueType™ fonts!

Canvas 3.5 gives you the power to create precise technical illustrations, stunning graphics designs, dynamic business presentation and awesome page layouts. Only Canvas combines precision illustration and high-resolution (up to 2,540 dpi) bitmap and image editing and desktop publishing features in one program. Canvas shares the same file format and interface with Canvas for Windows. Now accelerated for Power Macintosh™ for up to 600% faster performance!

Canvas Competitive Upgrade..... \$14999 #66819

#66820 \*Canvas w/ any CPU purchase



Canvas 3.5, Canvas bonus CD-ROM with 10,000 clip art images and 2,000 TrueType fonts, Pixar Typestry 2.1 and DeltaGraph Pro 3.5



Delta Graph A \$900 Value!!

To Order, Call Toll Free

PRIORITY CODE: D542MG14

• 800 • 222 • 2808 **MacMall Now Open 24 Hours!!** 





To Order, Call Toll Free PRIORITY CODE: D542MG14

• 800 • 222 • 28

**Call today** for your FREE Catalog!!

Fax: 310-222-5800

**Customer Service: 800-560-6800** 

International Orders: 310-787-4500

Mail: MacMall Order Dept., 2645 Maricopa St., Torrance, CA 90503-5144

### MacMall is your SUPERSOURCE!!

WIDE If you are looking for a Macintosh peripheral or accessory and don't see it then give us a CALLI We do our best to carry just about everything!

### DOS on Mac™ Card 486 DX2/66

Imagine combining the advantages of your Macintosh® computer with the freedom to run DOS and Windows software. Now, the DOS on MacCard from Reply provides an inexpensive and convenient solution for MacTM home users with DOS systems at work, business users in mixed environments, or Mac™ users with a requirement for specific software only available in a DOS format. Because the DOS on Mac™ Card is designed with a dedicated DOS system. And it's easy to switch back and forth between Macintosh® and DOS environments. Just hold down the Command key and press Return.

Run applications for DOS and Windows on your Macintosh computer

- Switch from the Mac™ environment to DOS instantly without quitting the Macintosh® applications you're using
- Open DOS and Windows files from the Macintosh® environment with Macintosh® PC Exchange software
- Use Macintosh®, DOS or Windows CDs in your Mac™ with the DOS on Mac™ card.
- Copy and paste information between Macintosh® applications and DOS or Windows applications
   Share memory installed on your Mac™ with the DOS on Mac™ card, or add up to 32MB industry standard memory to enhance the performance of DOS and Windows applications

  Connect a PC game controller or joystick to use with games for DOS and Windows

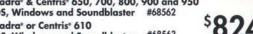
Publisher: Reply Corporation

for Quadra® & Centris® 650, 700, 800, 900 and 950 w/ DOS, Windows and Soundblaster

for Quadra® or Centris® 610

w/ DOS, Windows and Soundblaster

\$82499



# High Quality Images, Intense Color and Realistic Video Are Important To You, The CLARIFIER Is Your Solution!

The performance of all computer multimedia CD-ROMs, photo CDs, and audio compact discs can be maximized when treated with the BEDINI CLARIFIER. The CLARIFIER is a scientifically tested product that was developed as a result of several years of intense research and development. The CLARIFIER polarizes stored data in such a way as to maximize video color resolution, brightness and imaging, as well as enhancing audio high-fidelity. Independent laboratory testing of computer CD-ROMs has produced data to support the fact that Bedini clarified video files in some cases require less memory capacity and achieve faster CPU throughput with improved visual characteristics.

The BEDINI CLARIFIER allows you to experience the true potential and enjoy the optimum quality available from your CD-ROMs, Photo CDs before playing, you will discover a distinct improvement in video and audio quality: pictures that are brighter and sharper, sounds that are crisper and clearer. The CLARI-FIER is the superior technical solution and the only electromagnetic product designed specifically to treat and enhance compact discs in all applications.

AC adapter ...... 51799 #68867



**External PowerTape 4GB DAT**PowerTape is your low cost alternative to high capacity backup. With up to 4 gigabytes compressed capacity (2 GB native) and a great price, choosing PowerTape is easy! Plus, PowerTape gives you the quality and reliability of a quarter inch cartridge (QIC) system that's 50 percent faster than 4mm drives.

\* 4 Gigabyte capacity using data compression (2GB native)

•Up to 18MB/minute Transfer Rates. Typical rates of 10 to 15 MB/minute means a 1GB backup in just over an hour

•Complete with SCSI Controller for AT/ISA/EISA. Micro Channel® option available

Colorado Backup for DOS software. Includes powerful menu and command line operations.

# External PowerTape 2.4GB DAT • 2 Gigabyte capacity at a compression (1.2GB native) • Up to 18MB/minute Transfer Rates. Typical rates of 10 to 15MB/minute means a 1GB

- backup in just over one hour
- Complete with SCSI Controller for AAT/ISA/EISA. MicroChannel® option available.
- Reads Colorado's QFA-700 tapes for backward compatibility with Retrospect 2.1 and cable

PowerTape 1GB Internal w/Retrospect 2.1 ......5699\*\* #68847 PowerTape 2.4GB Internal w/Retrospect 2.1 ......1049\*\* #68848 PowerTape 4GB Internal w/Retrospect 2.1 ......51279\*\* #68849 Mounting Kit for 8100/80.... \$199 #68846



Macintosh®

A division of

HEWLETT

# ScanMaker IIHR

- 2400 dpi resolution (interpolated) true 600x 1200 optical resolution
- Maximum document size 8.5"x13.5"
- Includes a full version of Adobe" Photoshop 3.0 and OmniPage Direct
- Apple<sup>®</sup> ColorSync<sup>®</sup> compatible
- Full grayscale scanning capability
- · Optional transparency adapter and automatic document feeder



# ScanMaker IISP



The new single-pass ScanMaker IISP Color Flatbed Scanner with DCR™, the most accurate color system calibration available for the desktop, is another price/performance breakthrough from Microtek. Accurate color calibration for more vibrant, saturated and true color which used to be only available at a premium price on high-end scanning equipment. It is also Apple® ColorSync® compati-ble. Comes complete with Adobe™ Photoshop LE and OmniPage Direct. \$7 799 #62974

# ScanMaker II

This scanner uses a three-pass scanning This scanner uses a three-pass scanning method to capture full 24-bit color or 256 shades of grey. Features 300 dpi horizontal, 600 dpi vertical resolution, with a maximum of 1200dpi x 1200dpi x 1200dpi through interpolation. Includes Adobe Photoshop LE, OmniPage Direct and scan module with Automatic Contrast Control and Display Matching System, making it a snap to get great looking images on the first try.

#60906

# ScanMaker III

The ScanMaker III scans in 36-bit color, capturing images of up to 12 bits per RGB color channel. Scans up to 2400dpi for smoother,

more precise color gradations, detailed highlights and rich shadows, accurate midtones and a full photographic dynamic range up to 3.4. Includes FULL version of Adobe Photoshop.

# Get What You See, Final



**AVEC 2400** 

Color Scanner

The Avec Color 2400 is a scanner which maximizes the desktop personal computer into a working imaging tool. It is a three pass design, capable of scanning an 8 1/2"x 14" area in 24-bit, 16.8 million colors with a maximum resolution of 2400 dpi. This translates into 180,000 pixels per square inch, a true benefit for image scanning. Bundled with Adobe" Photoshop LE, OmniPage Direct OCR software and Art Scan Professional. The Avec 2400 has everything you need in an entry level color scanner with three times the specifications of the competition

at a lower cost, SCSI-2 interface.

# RELI 2412 Mac/TE

Color Scanner with Transparency Adapter

The Reli 2412 Mac/TE is an excellent choice for the desktop publisher. It is of a single pass design, capable of scanning a 24-bit 8 1/2"x 14" 16.8 million color image with a maximum resolution of 2400 dpi The 2412 Mac/TE maximum resolution translates into 360,000 pixels per square inch, which benefits anyone scanning color images and transparencies. Bundled with Adobe™ Photoshop LE, OmniPage Direct OCR software, Kai's PowerTools SE, Kai's PowerTools Tips and Tricks and ArtScan
Professional. Transparency adapter not shown.

### RELI 4816 Mac/TE

Color Scanner with Transparency Adapter

The Reli 4816 Mac/TE is an excellent choice for desktop publishers and graphic artists. It is a single pass design capable of scanning a 24-bit 8 1/2"x14" 16.8 million color image with a maximum resolution of 4800 dpi. The Reli 4816 Mac/TE maximum resolution translates into 1,440,000 pixels per square inch. Bundled with Adobe" Photoshop LE, OmniPage Direct OCR software, Kai's

PowerTools SE, Kai's PowerTools Tips and Tricks and ArtScan Professional. Transparency adapter not pictured.

RELI 4830 Mac/TE Color Scanner with

Transparency Adapter

The Reli 4830 Mac/TE is an excellent choice for desktop publishers and graphic artists requiring 30-bit color. It is of a single pass design, capable of scanning a 11 1/2"x14" image with a maximum of 16.8 millions colors at a resolution of up to 4800dpi. The Reli 4830 Mac/TE maximum resolution translates into 640,000 pixels per

square inch. Exclusive to Reli 4830 is its transparency adapter with an LCD light source built in to the scanner's cover, which provides even more flexibility for the graphics professional. Bundled with Adobe™ Photoshop 3.0, OmniPage Direct OCR, Kai's PowerTools and Kai's PowerTools

Tips & Tricks and ArtScan Professional. Transparency option not shown.

# RELI 9624 Mac/TE

Professional Color Scanner with

Transparency Adapter

The Reli 9624 Mac/TE is a scanning tool ideal for PrePress use and the graphics profes-sional. It is of a single pass design, capable of scanning a 24-bit, 16.8 million color image with a maximum of 9600dpi. The 9624 Mac/TE's maximum

resolution translates into 1,400,000 pixels per square inch. Includes transparency adapter for up to 8°x10° transparencies. Bundled with Adobe° Photoshop 3.0 image processing, Omnipage Direct OCR software, Kai's PowerTools, Kai's PowerTools Tips & Tricks and ArtScan Professional. Transparency option not pictured. Document feeder pictured is optional.

### RELI 9612 Mac/TE

Professional Color Scanner with Transparency Adapter

into 640,000 pixels per insparency adapter with scover, which provides fessional. Bundled with IR, Kai's

64999

#67716

The Reli 9612 Mac/TE offers offers the extra power ideal for PrePress use and the graphics professional. It is of a single pass design, capable of scanning a 24-bit, 8 1/2\*x11 1/2\*, 16.8 million color image with optical resolution of 1200x600. Includes a transparency adapter for up to 8\*x10\* transparencies. Bundled with Adobe" Photoshop 3.0, OmniPage Direct OCR software, Kai's PowerTools Tips and Tricks and ArtScan Professional.

\$146999

#66773

# Powercard<sup>™</sup> 601

Turn Your Macintosh® LC, Performa® or Quadra® 470, 570, 605 and 630 series into a PowerMac™

PowerCard 601 brings Power Macintosh™ performance to the latest family of entry-level Macintosh® computers. Developed in partnership with Apple®, this inexpensive PowerPC™ upgrade provides PowerMac™ performance for half the cost of a new machine. It is easy to install, and includes a 256K cache and System 7.5. And like the Power 601, the PowerCard 601 not only works with your current Mac™memory, it lets you run software on your Mac™ either as a PowerPC™ or 68K based machine.



# Turbo<sup>™</sup> 601

Turn Your Macintosh® Ilci into a PowerMac™!

Turbo 601 brings real Power Macintosh™ performance to your Mac™ Ilci in an easy to install PDS upgrade card. Turbo 601 runs as much as 11 times faster than a Mac" Ilci without an

upgrade. It even provides faster performance for 68k based applications. Get the best of both worlds because you can switch back to your 68030. Based on award winning design of DayStar's Turbo 040, we've added a 66MHz PowerPC™ processor, Apple® Macintosh® ROMs and a 256K secondary cache.



# Apple® External Hard Drives

Apple® quality performance and support

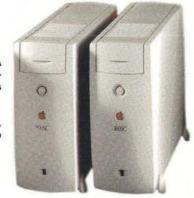
Now you can add reliable external storage to your Mac™ with all the quality you expect from Apple®, at prices that will surprise you. A long list of design and support features make the Apple" External Hard Drive the clear choice for additional storage capacity for your computer - or for additional font storage capacity for your printer. Featuring a flexible design with interchangeable foot pads, Apple® drives can be set up either vertically or horizontally. And its unique styling always looks great on your desk.

• Front panel power-on switch • Simple SCSI ID check or change under a front mounted pop-up panel • Complete set of cables, operating software and terminator • Cushioned foot pads protect both the drive and your desk in either a vertical or horizontal setup • Advanced 3 1/2 drive technology provides fast data access

270MB External \$35499 #67292 340MB External \$37499 #66395

540MB External \$43499 1080MB External \$82499

#65385 #66028



To Order, Call Toll Free

OFFER CODE: D542MG14

·800·222·2808 **MacMall Now Open 24 Hours!!** 



# **National Lampoon's Blind Date CD**



Meet Sandi your blind date for the evening - courtesy of D.U.D.S. (Dates for Desperate Shmucks). She may look like an angel, but watch out! She could be the blind date from hell. Play your cards right and you'll be better positioned than this product. Screw up

and she'll cut you off... literally. For the first time on CD (the game no other publisher would touch), National Lampoon's Blind Date: a rip roaring ride through dating purgatory. With more twists and turns than a motorcross racing game, you're sure to get a kick out of this adventure.

Requirements: Double-Spin CD-ROM Drive, 8MB RAM, 4MB Hard Drive, 256 colors and System 7.



# Thumbeling CD

Thumbelina is the delightful children's fairy tale by Hans Christian Andersen. In this interactive storybook that introduces children to the wonders of computers, kids can point and click on several "Hot Spots" on each page. With over 17 unique characters each with their own distinctive voice and an original musical score with 4 complete songs, Thumbelina will provide hours of pleasure for children.

- 12 screens, 256 colors, portrait quality art with hundreds of interactive animations and sound effects
- Complete spoken narration with animated read-along text on the screen with every word, clickable for readover
- Contains no confusing menus or set up screens. Children can literally play with "Thumbelina" by themselves

#68454 \$ 2999

# The Emperor's **New Clothes CD**

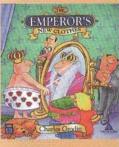


The Emperor's New Clothes is a delightful interactive storybook based on the fairy tale by Hans Christian Andersen. This fully animated interface will delight children for hours as they explore the story by dicking on "hot spots" which unveil hidden surprises. The Emperor's New Clothes is narrated by popular actor, Charles Gradin, star of the motion picture "Beethoven" and "Beethoven's Second"

- 13 screens, 256 colors, portrait quality art with hundreds of interactive animations and sound effects
- · Complete spoken narration with animated read-along text on screen

#68857





# Vivid Quest

# The best in removable media

VividQuest 88MB drives provide you with unlimited storage of your data with the flexibility of a floppy disk. Once you fill up one disk, just pop in a new one and you're ready to go. Transporting documents has never been easier, just place your cartridge in any SyQuest compatible drive and you are ready to get back to business! Archive irreplaceable files with the confidence that your data will not be compromised. VividQuest 88MB internal and external drives also read and write to 44MB cartridges,

### 270MB/RW105 External SyQuest Drive

w/ cartridge and cable

Seek Time: 13.5ms Data Transfer: 4.0MB/sec Size: 3.25"/1"

\$48999

200MB/RW88/44 External SyQuest Drive w/cartridge and cable

Seek Time: 18ms Data Transfer: 5.0MB/sec Size: 5.25"/HH

\$49999 #68861





88MB/RW44 External SyQuest Drive (no cartridge) \$299 #65496

# GENUINE SyQuest CARTRIDGES

	-	
270MB cartridge	56499	#64415
200MB cartridge		#64417
	5899	#61241
	5199	#3304
	\$4499	#1906



### FREE BONU

FWB Hard Disk Toolkit Personal Edition with purchase of external 88 MB drive

# **Fastest Delivery** Service Guarantee

"We deliver your order by 10:30am THE NEXT DAY or pay for your shipping"\*

\*Limited to in-stock orders placed before 8pm (EST) not requiring configuration and delivered to destinations within the contiguous U.S. by FedEx\* Next day not available to certain rural areas. Limit 10 lbs.



MacMall has all the latest PowerMac<sup>\*</sup>

Native Software!!

### **Coherent Visual**



Schedule meetings, note phone calls, create letters, track contacts and more! ..... \$22° #66626

### Rahmel Utilities for Newton®

Track daily expenses, create organizational charts, flash cards and much more!..

### **Common Words Dictionary**

### Spanish Flash Cards

Traditional flash cards of the Spanish language. Great for learning or reviewing Spanish. Beginner #66629, Intermediate #66630, Advanced #66631 each for \*16°° All three vols. for \$3200 #66632



OUR POLICIES \$3.00 FEDEX\* offer opplies to continental U.S. only, orders over 10lbs incur extra charges. Call customer service at 800-560-6800 or tech support at 800-760-0300 if you have a question or problem with any order. No packages will be accepted with out a Return Authorization Number form Customer Service. All returned products must be in original condition with all packaging and registration card, within 30 days of original invoice date. For International orders, please include a photocopy of the front and back of your credit card. Minimum International order is \$50 Canada, \$100 Foreign; \$20 in U.S.A. Apple and Hewlett Packard products cannot be shipped outside of the U.S.A. International orders shipped vio DHL, FOB Los Angeles. Apple, the Apple logo and Macintosh are registered trademarks of Apple® Computer, Inc. While we do our best to check for mistakes, occasionally they do occur. Prices and specs subject to change without notice. \$1995 MacMall



equipment lease with monthly payments starting at \$360 per month. A \$2499 value! PowerPC 7100/66 w/ CD

7100/66 VALUE STATION

ZERO DOWN!

\$232

SYQUEST

DRIVES

MODEL

SyQuest 270

SyQuest 200

vOuest 105

yQuest 88C

SyQuest 44

ARTRIDGES

**dsc** 

Quantum

CAPACITY

CAPACITY

**42MB** 

85MB

270MB

365MB

540MB

730MB

1.0GB

1.4GB

2.1GB

4.2GB

CAPACITY

2.5GB

4 3GR

1.0GB

2.4GB

4.3GB

3.4GB

9.1GB

MODE

Sony 650

Sony 1.3GB

PMO-1.3GB

Fujitsu-230

Sony P-301

5.25" CARTRIDGES

dsc / 3M 650MB

3.5" CARTRIDGES

Sony 650 /1.0 /1.3GB

Komag 650 /1.0 /1.3GB

Komag 128MB /230MB

dsc 128MB /Sony 128MB

Most-256

MODEL

MaxOptix-Tahiti II

MaxOptix-Tahiti III

Seagate

GO256MB

G0514MB

2.0GB

40MB RAM, 540MB HD

Extended keyboard

External SyQuest 88x w/ 1 cart Sony 17SF Trinitron monitor

AVision AV660 scanner w/ PS LE SuperMac Thunder 24 video card

TI Pro 600, 600 dpi, 8 ppm printer w/ 2 AppleTalk connectors Wacom 6x8 Artz Graphics Tablet

FREE: SyQuest 88MB cartridge!

SuperMicro Extended Services FREE! VIDEO PRODUCTION WORKSTATION ERO DOWN \$599

PowerPC 8100/100MHZ 72MB RAM, 2.1GB HD

Extended keyboard Radius 20e Trinitron monitor

SuperMac Thunder 24 video card

Radius Video Vision Studio Pro Pak including 4.0GB Fast&Wide disk array w/ Fast&Wide SCSI controller Internal Sony SDT-5000 DAT drive FREE: 10 tag

SuperMicro Extended Services

FREE: 10 tapes for SDT-5000

# SCANNERS **AGFA**

Sony 175F Trinitron monitor Radius 24xk video card

Avision AV660 scanner w/ PS LE

TI Pro 600, 600 dpi, 8 ppm printer w/ 2 AppleTalk connectors

Wacom 6x8 Artz Graphics Tablet

SuperMicro Extended Services

8829

5205

FREE: SyQuest

88MB cartridge!

The StudioScan II from Agfa has

400x800 dpi resolution with interpolation up to 2400 dpi. It captures extremely accurate, 30-bit color images up to 8.5" x 14".

SCANNER	DESCRIPTION	PRICE
Agfa StudioScan II	400 dpi flatbed	\$829
Agfa Arcus II w/trans	1200 dpi flatbed	\$2999
Avision AV660	600 dpi flatbed	\$569
ScanMaker III	1200 dpi flatbed	\$2499
ScanMaker IIHR	1200 dpi flatbed	\$1075
Tamarack 12000C w/trans	1200 dpi flatbed	\$999
Nikon CoolScan	2700 dpi slide	\$1659
Polaroid SprintScan	2700 dpi slide	\$1759
StudioScan II adapter	transparency upgrade	\$379
Microtek adapter	transparency upgrade	\$519

### TAPE DRIVES ONY \$1185! Sony DAT drives provide low cost data backup. With built-in FREEI 72 hour Replaceme Guarantee with any tape drive purchasel data compression, the Sony SDT-5000 holds up to 16GB on a 120 meter cartridge!

MODEL	CAPACITY	SIZE	MACKIT	dsc
Sony SDT-2000	2GB	3.5"HH	\$785	\$860
Sony SDT-4000	8GB	3.5"HH	\$999	\$1074
Sony SDT-5000	5-16GB	3.5"HH	\$1185	\$1260
Exabyte 8200	2GB	5.25"FH	\$1275	\$1350
Exabyte 8500	5GB	5.25"FH	\$2175	\$2250
Exabyte 8205	2-5GB	5.25"HH	\$1585	\$1660
Exabyte 8505	5-10GB	5.25"HH	\$2255	\$2330
Includes external o	drive, 25/50 S	CSI Cable, MA	C SW II and	d terminator.

Turbo version includes Retrospect

### **MULTIFUNCTIONAL DRIVES**

A multifunctional drive combines hard drive, optical drive, CD-ROM, tape and Syquest drive all



together in the same enclosure! They cost less and eliminate compatibility problems.

MULTIFUNCTIONAL	PRICE
Sony SDT 5000 /2.0GB Quantumm	\$2489
Sony 650MB Optical /SyQuest 200	\$2109
Sony 3.5" optical /Nikon Coolscan	\$2569
SyQuest 200 /540MB hard drive	\$759
SyQuest 88c /650MB optical drive	\$2059
SyQuest 88c /NEC 3X CD ROM /540MB HD	\$1149
128MB optical drive /540MB hard	\$979
NEC 3X CD-ROM /1.3GB optical drive	\$2449
2.1GB Quantum HD /8.0GB Sony DAT drive	\$2099
4.0GB Seagate HD /Nikon CoolScan	\$3029
Includes drive, 25/50 SCSI cable, terminator and Mac	software.

### SYSTEMS

SuperMicro has a complete line of Macintosh Quadra and PowerPC computers in stock. All system bundles are assembled and tested before shipping. Custom configurations

are our specialty.



CPU/XKEY/Mouse	Monitor/Card	CASH	MONTHLY
8100/80AV /72/540/CD	Sony 17" /Thunder 24	\$7399	\$171.65
\$100/100 /24/2.1/CD	Sony 20" /Thunder 24	\$8059	\$186.96
8100/110 /40/2.1/CD	Sony 20"/Thunder 24	\$8239	\$191.14
7100/66/24/1GB	Sony 17"/Thunder 24	\$5059	\$117.36
7100/80/40/700/CID	Sony 20" /Thunder 24	\$7495	\$173.88
6100/66/24/540	14" hi-res color monitor	\$2146	\$49.78
Q800/32/1.0GB/CD	Sony 20" /Thunder 24	\$7999	\$185.57
Q605/4/160	14" hi-res color monitor	\$1149	\$26.65

Circle 126 on reader service card













385 Van Ness Ave. #110, Torrance, CA 90501 310-782-5760 International • 310-782-5974 Fax



FWB Toolkit-FREE!

replacement plus

EXTERNAL

\$407 \$239

\$300

\$160

INTERNAL

\$367 \$199

\$260

\$130

270MB Cartridges (20 + or with drive purchase)

200MB Cartridges (20 + or with drive purchase)

SPEED

17ms

17ms

10ms

10ms

10ms

10ms

10ms

9.5ms

9.5ms

9.5ms

SPEED

B'cuda 2, 8ms

Hawk 1, 9ms

Hawk 2, 9ms

Hawk 4, 9ms

Elite 3, 11ms

Elite 9, Ilms

5.25" OPTICAL DRIVES

B'cuda 4, 8ms

NB 17ms

NB 17ms

icludes external drive, 25/50 SCSI cable, Mac SW, terminator

44MB CARTRIDGES ONLY \$44

105MB Cartridges (20 + or with drive purchase) \$50 88MB Cartridges (20 + or with drive purchase)\$44/46

44MB Cartridges (20 + or with drive purchase) \$38/41

HARD DRIVES

2.0GB ONLY \$799 INTERNAL EXTERNAL

\$799

\$429

\$99

\$130

\$175

\$208

\$249

\$299

\$595

\$765

\$989

\$2035

INTERNAL

\$1195

\$2395 \$565

\$1095

\$2015

\$2075

\$3695

OPTICAL DRIVES

650MB

1.3GB

1.0GB

1.3GB

1.3GB

3.5" OPTICAL DRIVES SONY 128MB \$799

CAPACITY

230mb

128mb

256mb

Includes external drive, 25/50 SCSI cable, Mac SW & terminator

Sony 650 \$999

SEEK

19ms

25ms

25ms

25ms

19ms

SEEK

30ms

35ms

37ms

BARRACUDA 4 ONLY \$

2.1GB ONLY \$989

INTERNAL EXTERNAL

\$899

\$398

\$549

\$159

\$190

\$235

\$268

\$309

\$359

\$655

\$825

\$1049

\$2095

EXTERNAL

\$2455 \$625

\$1155

\$2075

\$2175

\$3795

MACKIT

\$999

\$1999

\$1899

\$2395

\$2379

MACKIT

\$835

\$799

\$895

\$423

\$574

\$184

\$215

\$260

\$293

\$334

\$384

\$680

\$850

\$1074

\$2120

\$2505

\$675

\$1205

\$2125

\$2225

\$3845

\$1049

\$2049

\$1949

\$2445

\$2429

\$849

\$945

PRICE

PRICE

\$25 /29

\$39 /49

\$64 /79

\$75 /88 /95

\$69 /81 /88

\$432

\$264

\$325

\$185



### **DAYTONA Series**



provide unmatched mass storage solutions for the Apple PowerBook. The drives have advanced performance features like StackWrite firmware and a unique latching mechanism, called ShockLock, that provides maximum

protection against	non-operating shock.		
Capacity	Access	Internal	External
DAYTONA	2.5" Portable	Drives	
256MB	17ms	5279	5399
514MB	17ms	5449	5569

### **LIGHTNING Series**



### Maverick SERIES Value/Entry Level 3.5" Low Profile

270MB	14ms	5185	5245
540MB	14ms	5249	\$309

### LIGHTNING SERIES Value/Performance 3.5" Low Profile

365MB	11ms	\$209	5269
540MB	11ms	\$255	5315
730MB	11ms	5299	3359

### EMPIRE SERIES Performance/Capacity

3.5" Low	Profile		
1080MB	9.5ms	\$579	5639
3.5" Half	Height		
2100MB	9.5ms	s989	s1049
			to the de

### **GRAND PRIX/ATLAS SERIES** Performance/Capacity

3.5" Half Height \$ 209 2100MB 51149 9.5ms 4280MB 52219 \$2279 9.5ms

ng, Empire, Grand Prix, and Afles Series carry a 30-Day Money Back Guarantee and a TWO Year Warranty, Quantum Daytona Series carry a ONE Year Warranty.

Children

ACTIVE TERMINATION





53699

GREAT BUY

Unformatted Capacity Model
----------------------------

8600MB

**NEC MultiSpin 4Xe CD-ROM** 

multimedia development and networks, the NEC MultiSpin

4Xe features a data transfer rate FOUR TIMES faster

than single speed CD-ROM readers (600KB/sec) and a 220ms access time. You can get information faster, see

smoother animation and video, and keep network traffic flowing freely. The NEC MultiSpin 4Xe includes a Mac

Designed for high-performance CD-ROM applications,



\$3799

00

MultiSpin'

W PC

Untorm	апеа	Capacity	Mod	61
3.5"	Half	Heigh	t &	Lov

ed Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
alf Heigh	t & Low Profile					

2.4GB	ST31230N	Hawk 2 LP	9ms	2000MB	s999	\$1059
4.3GB	ST15230N	Hawk 4	9ms	4000MB	\$2019	\$2079
2.5GB	ST32550N	Barracuda 2 LP	8ms	2050MB	51199	51259
4.3GB	ST115150N	Barracuda 4	8.5ms	4000MB	\$2189	\$2249

5.25" Full Height -- External Elite Drives include the ClubMac ADT 3.4**GB** \$2079 \$2179 ST43400N Elite-3 11<sub>ms</sub> 2750MB

11ms

Seagate drives include a 30-Day Money Back Guarantee and a FIVE Year Warranty.

### CD-ROMs

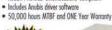
9.1GB

### ClubMac 2X CD-ROM

- 320ms average access time 64K data buffer

ST410800N

- Caddy-less design
   LED lights, headphone jack and RCA jacks
- Kodak PhotoCD (Multisession) compliant





Elite-9



ClubMac Dual-Speed 320ms access time, 300KB/sec transfer rate	5149
ClubMac Quad-Speed 220ms access time, 600KB/sec transfer rate	5289
NEC MultiSpin 2V 320ms access time, 300KB/sec transfer rate	5249
NEC MultiSpin 3Xp Plus 240ms access time, 500KB/sec transfer rate	\$399
NEC MultiSpin 4Xe 220ms access time, 600KB/sec transfer rate	5499
NEC MultiSpin CD-ROM Readers carry a TWO Year Warranty.	



## SyQuest<sup>®</sup> REMOVABLE TECHNOLOGY



MEDIN	The same of the sa	will be	wil Lo
44MB	3 <b>43</b> ea	5 <b>42</b> ea	541ea
88MB	148en	47ea	\$46ea
200MB	5 <b>76</b> ea	5 <b>74</b> ea	5 <b>72</b> e0
105MB	355e0	553ea	551ea
270MB	162ea	561ea	560ea
Annual State of the last of th		-	

All SyQuest drives include a 30-Day Money Back Guarantee, TWO Year Womanty, and ONE formatted cartridge. SyQuest cartridges include a FIVE Year Womanty.

Club Va

Optical Drive

ClubMac 230MB

# FEATURING (lubMac 270MB Removable



3.5" ClubMac 270MB \$449 \$479





5.25" ClubMac 200MB

ACTIVE TERMINATION Extern \$339 309

ClubMac 88MB 5.25"

Verbatin

ClubMac OPTICAL Drives

# CHOICE

# ClubMac 1.3GB MO

- 39ms average seek time 5.0MB/sec sync. data transfer rate
- 3,000 RPM rotational speed
- 80.000 hours MTBF

Seek Time

28ms

### **Best Low-Cost Solution**

argain hunters will appreciate the exc tech support and quality of this drive — December 1994, Macworld

# ACTIVE

5779

ACTIVE

External

5799

5.25" Sharp \$1499 ClubMac 1.3GB 39ms 51469 5.25" 1.3GB 52499 MaxOptix Tahiti III 1.3GB 19ms

Size/Model

3.5" Olympus

ClubMac Opticals include ONE cartridge, 30-Day Money Back Gr

OPTICAL 3.5" 128MB 5.25" 594MB \$79 5.25" 1.2GB \$28 MEDIA 3.5" 230MB 5.25" 652MB \$79 5.25" 1.3GB

### **ClubMac TAPE BACKUP Drives**

# ClubHar

Retrospect v2.1 Backup Software, ONE 120 Meter Tape and a TWO Year Warranty

ClubMac 2.0GB DDS DAT Drive

20 sec ave data access time (based on 60m tope)
 Up to 266 KB/sec data transfer rate

SCSI-1/SCSI-2 interface

· 60,000 hours MTBF

 Includes Switchable Active Termination, TWO Year Warranty Retrospect BackUp Software, and ONE 90m tape cassette

Copacity Model Format Medio Internal Externo ClubMac DAT 2.0GB DDS 60m, 90m 5739 5789 5919 4.0GB ClubMac DAT/2 DDS-2 60m, 90m, 120m \$869 \$999 4-8GB ClubMac DAT/2DC DDS-2DC 60m, 90m, 120m 5949

TAPE BACKUP MEDIA 4mm 60m \$10 4mm 90m \$12 4mm 120m \$25 ClubMoc DAT drives include Retrospect v2.1 Backup Software, ONE 90 Meter Tope and a TWO Year Warranty. The ClubMoc DAT/2 and DAT/2DC drive includes

ClubMac Active ADT)

Active Digital Termination (ADT) will solve your worst SCSI chain problems. ClubMoc's ADT monitors the SCSI bus seeking anomalies and then correcting them on the fly. This increases overall SCSI throughput for better performance. Four LEDs help diagnose possible SCSI bus problems. All of this for less than half the price of our nearest competitor.





### Monitors, Graphic Cards & Multimedia

IntelliColor Display/20e

USDIAY/20e

The Robus Intelliction Display/20e delivers unrivoled command of your desktop, from orther By resolution switching to state-of-the-ort corton remperature control. Combined with Rodius' Intellictor software, it allows you to remaide a Bighting conditions and user-adjustable color temperature, so you get more recruiter color respectantion. accurate color representation



IMOUNTOL2	
PressView 21T Display System (PV2102)	53199
SuperMatch 21 T XL Trinitron (STD2102)	\$2139
IntelliColor Display/20e (0461)	s1939
PrecisionColor Display/17 (0460)	s989
SuperMatch 17 T PRO (STD1702)	\$819

### VideoVision Studio 2.0 With JPEG bardware

compression and decompression for full-screen, full-motion recording and playback from a hard disk, VideoVision Studio combines the power and flexibility of the Macintosh with the ease and transportability of video tape. Multimadia



P	owerM	ac 810	O Compatible !!

muningula	i augimae a roa aambannie ii
VideoVision Studio 2.0 (0418)	53779
VideoVision Studio 2.0 Upgrade	9 (0419) <b>51789</b>
Spinot Power AV (DV1630)	\$759

Thunder Series GRAPHIC ACCELERATORS Super Resolution at Earth-Shaking Speed.



# **Thunder IV Series**

Three Thunder IV GX cards extend the 24-bit resolution of the PowerMac's built-in-video. Accelerated 24-bit color, built-in Photoshop acceleration, CMYK

acceleration, hot-key resolution switching, pan and zoom, color composer and 10-bit DAC add up to make these cards the number one choice for image processing, compositing and illustration.

\* Limited time offer, FREE ColorComposer software is included with each Thunder Series card.

Thunder IV GX-1600 (0513) ..... Thunder IV GX • 1360 (0446) ..... Thunder IV GX-1152 (0485) ..... Thunder/24 GT (0491)

**GRAPHIC CARDS** 

ColorComposer software	
52879	i
52339	1
51949	
\$1359	



### 15" MultiSync XV15

- · Perfect entry level business, small office/home office, home education/entertainment
- 15" diagonal flat square technology
- FullScan capability for edge-to-edge images
- · Moc and PC compatible
- · Fine 0.28mm dot pitch

9 040 X 400 UP 10 1024 X 700 IE	SOMMON
14" MultiSync 2V	335
15" MultiSync XV15	s445
15" MultiSync XE15/XP15	5569/659
17" MultiSync XE17/XP17	5999/1225
21" MultiSync YF21 /YP21	\$1989/2435

### 15" MultiScan Trinitron 15st

· Designed for entry level business, small office/home office, and home artice, and home education/entertainment.



- · 0.25mm Aperture Grille Pitch
- Resolution up to 1280 x 1024 at 60Hz
- · Color temperature controls
- . Energy Star and MPR II complaint • THREE Year Warranty

15"	MultiScan	Trinitron	15sf	\$445
17"	MultiScan	Trinitron	1730	\$879
17"	MultiScan	Trinitron	17-SE1.	\$995
20"	MultiScan	Trinitron	20ses	1929

# Scanners AGFA StudioScan II

StudioScan II	s859
StudioScan	s679
StudioScan II Transparency Unit	\$379
StudioScan Transparency Unit	5379

# MICROTEK



ScanMaker IIG OmniPage Direct	\$399
ScanMaker IISP Photoshop LE, OmniPage Direct	5769
ScanMaker IIHR Photoshop, OmniPage Direct	
ScanMaker III Photoshop	<sup>5</sup> 2529
Microtek scanners carry a ONE Year Warranty.	

# (A) HEWLERT HP ScanJet IIcx Scanner



III JUIDEI IICA JUIIIIEI	/ //
HP ScanJet 3p Scanner	5479
HP ScanJet Ilcx Trans. Media Adapter	5629
HP ScanJet Ilcx Auto Document Feeder	<sup>5</sup> 465
HP ScanJet 3p Auto Document Feeder	s199
HP scanners carry a ONE Year Warranty. *After \$150 rebate, ends	3/31/95

### EPSON Epson ES-1200C Pro Mac Scanning System



	P	ri	n	te	rs
--	---	----	---	----	----



PACKARD

Authorized



6ppm Print Speed · 300 dpi print resolution

· Adobe PostScript Level 2 inter 35 True Type fonts · 3MR PAM standard

### **HP DeskWriter 320 Printer**

**NEC Silentwriter Model 640** 

Perfect companion for the PowerBook
 600 x 300 dpi with HP's exclusive REt technology for crisp, black output

. Up to 3ppm (draft mode) . Up to 16.7 million colors with the optional Color Kit



### Modems

\$299

5369

\$289

\$1629

\$1028

\$1368

Supra FAX Modem

28.8

Mac&Fax



Supra Express 14.4 Plus NEW	199
SupraFAXModem 14.4 LC V.32bis, V.42bis w	/FAXcilitate & Micro 139
SupraFAXModem 14.4 MC V.32bis, V.42bis	w/FAXcilitate & Micro.*199
SupraFAXModem 14.4 PB v.32his, v.42 Int.	for Powerbook 5159
SupraFAXModem 28.8 MC V.Fast Class	1225
SupraFAXModem 28.8 PB V.Fast Class	1299
Dobotice	Sportster



THE RESERVE OF THE PARTY OF THE	CALL THE CALL
Sportster 28.8 Mac&Fax V. 34 and V. Fast	Class\$
Sportster 28.8 Mac&Fax V. Fast Class	
Sportster 14.4 Mac&Fax V. 32 bis	S

# ActionScanning-Mac Up to 1200 dpi, PhotoShop LE, ScanTastic.

A GLOBAL VILLAGE **TelePort Mercury** 



	Milde
portster 28.8 Mac&Fax V. 34	and V. Fast Class\$2
partster 28.8 Mac&Fax V. Fa	st Class
portster 14.4 Mac&Fax V. 32	bisS1

# **Input Devices**

OneWorld Combo 2-Line Ethernet Fax/ARA/Modem

Mercury 19,200, V.32 Turbo

Gold 14,400 V.32 bis

ArtPad 4x5 ArtPad 4x5 ADB Tablet	T s
ArtPad 4x5 ADB Tablet with Dabbler Bundle	
ARTZ 6x8 ADB Tablet with Painter Bundle	
UD 12x18 Standard Tablet	S6
UD 12x18 Electrostatic Tablet	S7
	ArtPad 4x5 ADB Tablet

# Acceleration

# UPGRADES

80 MHz PowerPro 601 with Cache ..... \$1869 100 MHz PowerPro 601 with Cache... \$2159



FOR ENTRY LEVEL MACS 66 MHz PowerCard 601 ..... 5599



### Transform your Mac into a PowerPC Powerhouse!

### UPGRADES ----FOR '030 DESKTOP MACS

66MHz Turbo 601 for Mac Ilci ....... \$1149 40MHz Turbo 040 with Cache.... Mac Ilcx Adapter for Turbo 040......5129 PowerCache Adapter for Turbo 040\* .. 599

\* Not reg'd for Ilci, Ilvi, Ilvx Performa 600



### Networking

10THUB/12	10BT Hub w/12 10T, Thk & Thn ports	369
10THUB/8	10BT Hub w/8 10T, Thn port	\$189
Micro EN/SC	Thn/10BT SCSI Ether w/DT& PB cable	5265
	10T SCSI Ethernet w/DT & PB cable	\$215
AP10T	Micro AsantéPrint, 1ÓBT	<sup>5</sup> 285
AP3	Micro AsantéPrint, Thk/Thn/10BT	5309
FN10TA	10BaseT FriendlyNet Media Adapter	549

# **MASANTÉ**

MGNB-TN	Mac II & Perf 600, NuBus, Thk/Thn	511
MCINB-10T	Mac II & Perf 600, NuBus, Thk/10BT	s10
MCILC-TN	Mac LC/Q6xx/Clr Classic, Thn, FPU	510
MCLC-10T	Mac LC/Q6xx/Clr Classic, 10BT, FPU	58
NETEXT-FN	AAUI Hub w/4 RJ45 ports	513
AUTOMORPHICA AND A STATE OF THE	AMERICAN DESCRIPTION OF THE PROPERTY OF THE PROPERTY OF	100000

### CALL FOR FREE CATALOG

Winterfeit: All term manchorous by Eddelic on enterned to Clubbles for warranty rapoir. All other items corry manufactured is consumed to the Committee. All products manufactured is warranty, heavy back Committee. All products manufactured is warranty and the committee of the Clubbles control of the month back grounders when specifies. Enternet Call for RNA are better if her product first in students will be refused. All product reference in the product first in students will be refused. All product reference in the product first in students and prices are subject to change without moster. Not reproduct but proparables called.

VISA

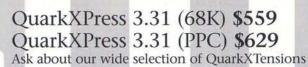
NO SURCHARGE!



### Catalog Reseller **NEW SALES HOURS** M-F: 5:30am-7:00pm PST

SAT: 7:30am-4:00pm PST

Info (714)768-8130 • Tech Support (714)768-1490 Fax (714)768-9354 • 7 Hammond, Irvine, CA 92718





TI microLaser Pro PS23 \$1198 8 pages per minute • 600 dpi • 6 mb RAM 1MB TI Upgrade \$89 • 2MB \$159 • 4MB \$278

PowerBook 540c \$3999
Call for Complete Macintosh System Pricing



Vista S8 LE	882
UC630 LE	
Vista S6 LE	749
UC840 MacPro	885
UC1260 MacPro	1129
Transparency Adapter	449
PowerLook	

UMAX 1260 \$1129 16 MB SIMM \$489



1MB 30pin 120ns	25
2/4MB 30pin 80ns	80/137
4MB 72pin 60/70/80n	sfrom 154
8MB 72pin 60/70/80n	sfrom 299
16/32MB 72pin	489/999
LC/Quadra VRAM	29/19
PowerMac Level II Cad	che Card149

MP SIMM \$499 Toloport



1	Teleport Mercury	271
	Teleport Gold II	
j	Powerport Gold	239
1	Powerport Mercury	315
1	Powerport Mercury PB500	315
1	Powerport Duo Mercury	319
	OneWorld Fax Server	

Teleport Mercury \$271



Attention Power Macintosh Owners! PowerClock\*\* accelerates CPU performance by 40%. User installable in seconds. Clips in place. Total compatibility. 30 Day MBG.

PowerMac 6100 to 84MHz	129
PowerMac 7100 to 84MHz	129
PowerClock Level II Cache	189

NEW! Power Mac Accelerator Supports New Performa 6115 Series

# Call for latest prices All new Apple CPU's

CPUs	
PowerPC 6100/66	1736
PowerPC 7100/80	2799
PowerPC 8100/100	3548
PowerPC 8100/110	6199
Powerbook 540c 4/320	0.4299
Quadra 630/720	Call
Powerbook 150	1415
Performa Series	Call
Apple 15" Monitor	515
Apple 17" Monitor	995

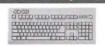
Custom	confi	guratio	ons ava	ilable.

PowerBook Upgrades		
160 to 180	399	
145 to 170	129	
140 to 180	300	

# INPUT/OUTPUT

Artz289	)
Artpad148	
12x12 RM509	)
Keyboards/Mice	
DGR Extended Keyboard 59	)
Kensington Turbo Mouse99	}
Apple Design Keyboard87	
Apple Adjustable Keybd 120	1

### **DGR Ext Keyboard**



105 key full featured extended keyboard for Macintosh. Fully ADB compatible. **DGR** 

\$59 Technol

### NETWORKING

THE PROPERTY OF THE PARTY OF TH	_
Asanté	
FriendlyNet Adapter	69
MacCon+ IIE641	
Farallon	
Etherwave Adapter1	79
Etherwave Transceiver	99
NEW! Magic EtherNet	
aaui Transceiver 10BaseT	39
aaui Transceiver thin	39
Magic 8 port Hub1	
PRINTERS	

### PRINTER Apple

Apple	
Laserwriter Select 3601415	
Hewlett Packard	
Deskwriter 320309	
Deskwriter 540325	
Deskwriter 560c559	
Laserjet 4ML w/toner1075	
Laserjet 4MP w/toner1395	
Texas Instruments	
microLaser PowerPro1635	

 microLaser Pro PS65
 ....1525

 microLaser Pro PS23
 ....1198

 microLaser 600
 ....933

 microLaser Pro E
 ....1369

 microWriter PS23
 ....625

 Toner PS65/23
 ....165

# VIDEO SOLUTIONS

Multisync	XE15	15"		57	5
Multisync	XE17	17"	1	06	0

### Jetlnc. Inkjet Refill

2pk Blk/Color......15.99/9.99 2pk High Capacity Blk....19.99 500/50/60c/310 8pk....55.95 Color StyleWriter 1pk Blk...5.95 Cyan/ Yellow/

Yellow/ Magenta 5.95 ea. Multisync XE21 21" ......2095 Multisync XP15 15" Prof...695 Multisync XP17 17" Prof 1295 Multisync XP21 21" ......2588 NEC 2V 14" Value Color ...359 NEC 3V 15" Value Color ...499

### Radius/SuperMac

IntelliColor 20e	1875
Precision Color 17"	999
Precision 21"	1999
SrudioArray 4GB RAID	5599
Two Page Display 20gs	s789
Two Page Display 21g	s979
Pressview 21T	3199
SuperMatch 17T	949
Thunder IVGX 1600	3038
Thunder IVGX 1360	2399
Thunder IVGX 1152	2052
Thunder/24GT	1436
THE SALES OF THE PARTY OF THE STREET, WHEN THE STREET, WH	

### Sony

20" Multiscan GDM-2036s 1949 15" Multiscan T 15SF1.....445

# BOTTOM LINE 24-HOUR INTERNATIONAL SALES FAX (512) 892-4455



Internet: world@dgr.com Subscribe to our specials list Bottom Line Distribution is committed to the needs of the international Macintosh user and reseller. We offer discounted rates with DHL, UPS International and Airborne Express. Delivery times to most countries is 2 to 3 days. We stock 220v versions of most hardware. Dealer inquiries are welcome. Language interpreters are available. Se hace pedidos internacional. Nous acceptons des commandes internationales. Internationale Handlerkonditionen.



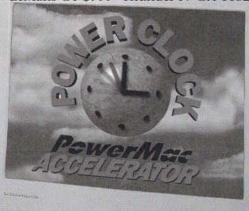
4544 S. Lamar Blvd., Suite 100, Austin, TX 78745

Wacom 12x12 RM \$509 Wacom ArtPad/ArtZ \$148/\$289



Fractal Painter 3.0 \$299 New! Accelerated for Power Macintosh

### Radius PrecisionColor 17 \$999 LeMans GT \$799 Thunder IV GX 1152 \$2052



Magic SyQuest	SyQuest Media
4 1/2 Mice MacUser	SQ44\$43
88c Ext\$315	SQ88\$49
200 Ext\$419	SQ 200\$79
270 Ext\$399	SQ 270\$63

### Media Blowout!

Optical Medi	ia
128 Opt	\$25
230 Opt	\$35
256 Opt	\$59
1.3Gb Opt	\$89





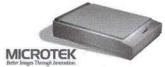
Supra	Express 14.4 Plus	98
Supra	FaxModem 14.4	179
Supra	FaxModem 14.4LC	136
Supra	v.32bis PB 14.4 Internal.	169
Supra	FaxModem 28.8	229
Supra	PB 28.8 Internal	317
	Speed Modem Cable	

Supra V.34 28,800 \$229

radus



Thunder II GX 1360 .....1199 Thunder II GX 1360 \$1199



Scanmaker IIhr	1045
Scanmaker IIsp	
Scanmaker IIxe	869
Scanmaker III	2489
III Transparency Adapter	139
35T Slide Scanner	953
45T Slide Scanner	5399

ScanMaker IIhr \$1045



230 Optical Drive	749
1.3GB Optical Drive	
270 SyQuest (4 1/2 Mice)	399
200 SyQuest (4 1/2 Mice)	419
128MB Optical Cartridges	25
256 MB Optical Cartridges	59
1.3GB Optical Cartridges	89

Magic CD-Rom Pro \$379 4<sup>1</sup>/<sub>2</sub> Mice MacUser Dec 94

**Graphics/Word Processing** 

### RasterOns

ClearVue 17	749
20/20 Multin	node1579
Clearvue 21	2222

# **ACCELERATORS & CACHE**

PowerPro Accelerators -66MHZ 601 Mac Ilci .....1248 66MHZ PowerCard 601..1498 80MHZ PowerCard 601..1998 Fast Cache 1MB Cache ....498 68030 Accelerators -

40MHZ Turbo (68040).....949

### DiiMO

DiiMOCache 128K.....129 DiiMOCache w/FPU 128K.210 DiiMOCache 50MHZ......439 DiiMOCache 50MHZ w/FPU518

Magic

PowerClock 6100/6150...129 PowerClock 7100 .....129 PowerClock Level II Cache 189

# DRIVES & TAPES

LMD	
Jackhammer	589
All others	call
Magic	
2GB External	1149
1GB External	
2GB RAID	2049
4GB RAID	2946
2GB Tape w/Retrospect	699



230 MB Optical	875
1.3 GB NEC Turbo	2024
Tornado CD-ROM Drive	358

	589
	call
	1149
	699
	2946
ospect.	699

### DGR CD/Opticals



# Agfa

SyQuest

Studio Scan II ......865 **Hewlett-Packard** ScanJet Ilcx (w/rebate) ......789 Call for rebate details. Coolscan Slide Scanner..1208 UMAX All models .....call

CD-ROM

Fastest, Highest Rated CD's: DGR Tornado CD Rom .....358 Magic CD Pro ......379 Magic CD Pro 3501 4X.....435 GAMES I Castle Wolfenstein ......39

Flying Nightmares Power PC55 Marathon 3D.....39 Myst ......49 PGA Tour Golf II ......59 SimCity 2000.....39

Warlords II.....

### **SOFTWARE Utilities Software**

Adobe Super ATM......98 KPT Converter.....84 MacLinkPlus Translators 8.0.96 Norton Essentials PB ......85 Now Utilities 5.0.....83 Quick Keys 3.0.1.....90 Retrospect 2.1.....139 Stuffit Deluxe 3.5.....75

### Magic Modems



**Fax Modems** Magic 28.8 V.FC.....119

Magic 14.4 Data/Fax ......99 High Speed Modem Cable 15 Adobe Illustrator 5.5......408 Adobe Photoshop 3.0......625 Adobe Premiere 4.0 ......539 Aldus Freehand 5.0 PPC...390 Aldus Pagemaker 5.0 ......499 Aldus Persuasion 3.0 PPC 349 Claris Works 3.0 .....129 Fractal X2......40 Kais Powertools 2.1......115 MS Works 4.0 ......159 MS Word......329 Word Perfect 3.1 ......75 **Business Software** Colleague Business......649

Filemaker Pro 2.1.....99 MS Office 4.2 w/RAM Dblr..475 MS Power Point 4.0 ......329 Ouicken 5.0 ......42

**Communications Software** Fax STF 3.1.....65 Microphone 5.0.....109

TO ORDER FROM BOTTOM LINE: Call 1-800-990-5793. Payment: Visa, Mastercard, Discover & American Express. No surcharge on credit card orders. Tax: Texas residents add 8% sales tax. Prices: Items and prices subject to change and availability. Terms: Net 30 available. Shipping: minimum \$5-UPS Ground, Blue, Red, & Airborne. Returns: All returns must be in original condition and packaging and require an RMA number. Seal must not be opened software. Returns may be subject to a restocking fee. Original shipping is non-refundable. Direct mail to: Bottom Line Distribution 4544 S. Lamar Bivd., Suite 100, Austin, TX. 787-45. International Orders: Bottom Line provides the extra level of support international clients require: 24-hour international fax line, 220-volt versions of most hardware, discount rates and customs brokerage available via DHL. 2-3 DAY DELIVERY available to most countries. Bottom Line provides the care are trademarks of their respective holders.

1-800-990-57

4/95 MW

Open Seven Days a Week

Fax: 1-512-892-4455 4544 S. Lamar Blvd., Suite 100, Austin, TX 78745



# COMPUTER DISCOUNT WAREHOUSE™



# Microsoft | | LW 1

# **Microsoft**

# Office V4.2 A whole new way

to work Experience the power of Microsoft's best-selling applications and the seamless integration made possible by Microsoft Office. Plus, Microsoft Office

PowerPoint V4.0 Mail license



Version upgrade . . . . . . . .

\$214.79\*..cdw 45219

TELEPORT GOLDI

\* After \$40 mail-in manufacturer rebate (ends 3/31/95)

Rehate





### **Global Village** TelePort Gold II

Fast, easy and affordable!

Data: V.32bis (14.4K bps) • Fax: 14.4K bps send and receive . V.42bis and MNP5 data compression • V.42 and MNP2-4 error correction

 Includes award-winning GlobalFax" software • 5 year warranty



\$126.72

# 800-509-4CDW



MacDeal\$™ says: "For all your Macintosh computing needs, call and order your free **Macintosh®** catalog today!"



### Top-Selling Macintosh Software

### Illustrator V5.5 + CD uasion V3.0 Photoshop V3.0.1 Premiere V4.0..... 504.15 Streamline V3.0. Super ATM Type Manager V3.8

Aldus	
Freehand V4.0	369.69
Freehand V4.0 upg	131,47
Gallery Effects Vol. 1	125.78
Home Publisher V2.0	44.51
Pagemaker PMac V5.0	
Pagemaker PMac V5.0 upg	165.84
Pagemaker V5.0	541.35
Aladdin SitCom	
Altsys Fontographer	248.17
Apple System 7.5 upgrade	89.95
Ares Font Hopper	39.31
Ares Fontmonger V1.5	89.87
Avery MacLabel Pro	45.95



### Microsoft Word V6.0

Upg \$79.86\* 45379 3.5" \$284.79 45294 Includes \$30 manufacturer rebate (ends 3/31/95)

### Broderbund

Automap Atlas	
Carmen Sandiego/Time	29.31
Carmen Sandiego/World DLX	39.36
Carmen Sandiego/World DLX CD-ROM	43.33
MYST CD-ROM	47.24
Prince of Persia	29.24
The Printshop Deluxe V1.1	46.88
Typestyler V2.0	118.77
BestWare MYOB Accounting V4.0	99.77
Caere OmniScan	295.50
Claris	
Claris Draw V1.0	
THE RESERVE OF THE PARTY OF THE	

ClarisWorks V3.0 w/Organizer	118.46
FileMaker Pro V2.1	
FileMaker Pro V2.1 comp upg	111.07
Impact V1.0	
MacPaint V2.0	79.11
Connectix	
Desktop Utilities	55.85
PowerBook Utilities	55.85

Desktop Utilities	55.85
PowerBook Utilties	55.85
RAM Doubler V1.5	54.32
CA Cricket Graph III V1.5	85.33
Caere OmniPage Direct V2.0	59.29
Caere OmniPage V5.0	297.38
Corel Gallery V1.0	33.22

Dantz	
Diskfit Direct V1.6	29.72
Diskfit Pro V1.1	69.38
Retrospect V2.1	
DelrinaFax PRO V1.5.1	52.86
Opus & Bill Screen Svr	29.60
Dataviz MacLink+/PC Connection	
Datawatch Virex V5.5	59.52
DCA Crosstalk	112.53
Delta Point DeltaGraph Pro V3.0	125.57
Deneba Canvas V3.5 + CD	254.17

Entertainment	
Berkeley After Dark V3.0	29.72
Berkeley Disney Screen Svr	27.79
Berkeley Star Trek Screen Svr	28.21
Comptons King James Bible	16.60
Electronic Arts Chuck Yeager	
Electronic Arts PGA Tour Golf II CD	38.26
Interplay Battlechess	18.38
Interplay Peter Gabriel XPLORA 1	45.52
Interplay Star Trek 25th Anniversary	34.79
LucasArts Loom	17,93
LucasArts Secret of Monkey Island	19.66
Maxis A-Train w/Contruct Set	29.00
Maxis EL Fish	29.00
Maxis SimAnt	18.50
Maxis SimCity 2000	38.97
Maxis SimCity Classic	24.33
Microprose Civilization	43.33
Paramount Jump Raven CD	38.97
Paramount Lunicus CD	38.67



### Microsoft PowerPoint V4.0

Upg \$109.84 45380 3.5" \$288.87 45295

Psygnosis Lemmings	34.07
Sierra Freddy Pharkas	23.76
Sierra Hoyle Classic	28.15
Sierra Kings Quest VI	44.39
Sierra Leisure Suit Larry 5	23.76
Spectrum Holo Iron Helix CD	56,80
Spectrum Holo Super Tetris	29.30
Spectrum Holo Tetris	23.85
ST:TNG Interactive Tech Manual CD	39.13
Velocity Dev Spectre VR	34.07
Virgin 7th Guest CD	43.10

	1 1000101	
V1.0.		
V3.0		
r V1.0		

.302.89 Framereader
FWB Hard Disk Toolkit Personal V1.6
Gryphon Morph V2.0
Hayes Smartcom III V3.4
HSC Kai's Powertools V2.0

### Insignia

Soft PC V3.0	99.92
Soft PC with Windows	297.73
Soft Windows Power Mac V1.0	302.72
Solutions Pro V3.1	194.04
Inline INITpicker V3.0	44.28
Intuit Quicken V5.0	42.00
Kent Marsh Folderbolt V1.02	

### Lotus

1-2-3 V1.1	277.73
1-2-3 V1.1 comp upg	94.79
1-2-3 V1.1 Server upg	98,69
Light Source OFOTO V2.03	189,87

### Microsoft

Cinemania 1994 CD	49.18
Encarta 1994 CD	84.82
Excel V5.0	289,49
Excel V5.0 Upg	109.88
Flight Simulator V4.0	39.38
FoxPro V2.6	89.88
Office V4.2	429.89
Office V4.2 vers upgrade	254.78
PowerPoint V4.0	288.87
PowerPoint V4.0 upgrade	
Project V3.0	
Project V3.0 comp upg	131.14
Word V6.0	284.79
Word V6.0 vers upgrade	109.86
Works V4.0	84,74
Macromedia Action Bundle	202.10

kXPress V3.3	569.50
Ray Dream	
Depth V1.0	98.58
anix 1/2 /	non ne



QuarkXPress PMac V3.3.1 CD



### Microsoft Excel V5.0

Upg \$79.88\* 45378 3.5" \$289.49 49853 \*Includes \$30 manufacturer rebate (ends 3/31/95)

### Symantec

MacTools Pro V4.0	92.10
Norton Utilities V3.1	95.64
SAM AntiVirus V4.0	64.36
Suitcase V2.1	49.36
Software Ventures MicroPhone Pro	132.14
Software Ventures MicroPhone Pro Bestware MYOB Accounting V5.0	

WordPerfect

If You Find a Better Price, Call CDW Before You Buy (800)509-4CDW



BUY WITH CONFIDENCE CDW® IS A NASDAQ TRADED COMPANY

No Surcharge For Credit Cards



CDW® HOURS Sales 7:00-9:00 CST Mon-Fri. 9:00-5:00 CST Sat.

9:00-5:00 CST Sat.

Free technical support for CDW customers

WHY PAY RETAIL? CDW® SELLS FOR LESS AND SERVICES YOU BETTER!

# NT WAREHOUSE"

A



COMPU	
Monitors	
NEC	
XE15 15" flat sq	539.50
XE17 17" flat sqXE21 21" flat sq	1979 74
XP15 15" flat sq	659,49
XP17 17" flat sq	1236.86
MAGNAVOX	000 00
CM2080 14" .29mm 20CM64 20" .31mm	999.00
SONY	
	447.92
15sf1 15" Trinitron	879,48
17se1 17" Trinitron	1895 00
Radius	
Precisioncolor 15" Pivot Precisioncolor 17" full pg	754.67
Precisioncolor 17" full pg 20GS 20" mono dual pg	959.01
Intellicolor 20"	1829.56
RasterOps	
Secretary of the Control of the Cont	
Sweet 16" color full pg	939.52
20/20 20" color full pg 21" color dual pg	1469.83
	2319.14
SUPERMAC.	
Supermatch 17T 17" color	916.95
Supermatch 17T 17* color Supermatch 20+ 20* color	1509.85
Supermatch 20TXL 20" color	2009.25
Graphics/Video Boards	_
E-MACHINES.	
Futura SX	
Ultura LX	1026.40
Powerlink Presentor	401.72
Radius	
Precisioncolor 8XJ 8-bit	456.56
Precisioncolor Pro 24XP	268.26
Precisioncolor Pro 24X	939,88
RasterOps	
24MX 24-bit 2MB	487.99
PaintBoard 8LI 8-bit 1MB	325.41
PaintBoard Lightning 24-bit 3MB	698.88
PaintBoard Turbo 24-bit 3MB XL CorrectColor Calibrator	936.52
SUPERMAC	
Spectrum/8 Series III	248 77
Spectrum/24 Series IV	749.00
Thunder/24	904.37
Thunder 24 DSP upg	279.29
Thunder II	411.72
Supermatch Calibrator	311.85
PRIOR NOW	
MASANTÉ	APA PA
10THUB 12 port 10BT +AUI/BNC 10THUB 8 port 10BT +BNC	176.59
Asantelite LC-10T 10BT	99.24
Asantelite NB-10T 10BT	105.97
Asantelite NB-TN Coax AsantePrint 1002 APL Bridge AUI/BNC	112.36
FNTKA Transceiver AUI/AUI	64.70
FNTNA Transceiver BNC/AUI	54.89
MC+30IE64 Coax	149.57
MC+30IET64 10BT Mini EN/SC SCSI Combo	264.72
Mini EN/SC10T SCSI 10BT	233.16
EN/SC SCSI Combo	299.29
# Dayna	
Daynaport SCSI/Link Coax	249.95
Daynaport SCSI/Link PB-T 10BT	269.27
Daynaport SCSI/Link PB-3 Combo	302.14
Etherprint APL Bridge BNC/AUI Etherprint-T APL Bridge RJ45/AUI	319.00
Etherprint-3 APL Bridge BNC/RJ45/AU	355.40
FARALLON	
EtherWave AAUI Transceiver 10BT	94.47
EtherWave AUI Transceiver 10BT	97.87
THE RESERVE OF THE PROPERTY OF	
EtherWave LC-F Adapt. w/FPU 10BT	169.74
EtherWave LC-F Adapt. w/FPU 10BT EtherWave NuBus Adapt. 10BT	169.74
EtherWave NuBus Adapt. 10BT EtherWave Adapt. (PwrBk, Classic) 10l EtherWave Printer Adapt. 10BT	169.74 171.07 BT252.84 253.12
EtherWave LC-F Adapt. w/FPU 10BT EtherWave NuBus Adapt. 10BT EtherWave Adapt. (PwrBk, Classic) 10l EtherWave Printer Adapt. 10BT EtherMac SCSI-TP (PowerBook) 10BT EtherMac SE-C Combo	

R DISCOU
Communications/Modems
Record   Control   Contr
ALGENETICAS.
14.4 external mini-tower w/fax
Supra
14.4K w/LCD
Mac&Fax Sportster 14.4         113.64           Mac&Fax Sportster V.34         248.33
CD-ROM Drives —
Chinon CDA-535 220ms/300KB 306.86 NEC MultiSpin 2V Mac kit 226.07 NEC MultiSpin Mac software kit 39.95 Plextor 4Plex 220ms/600KB Mac kit 513.88  ■ FWB  PocketHammer 240MB 527.32
Pockel+lammer 500FMF 530MB . 652.99 Pockel+lammer 100FMF 1.0GB . 932.36 Pockel+lammer 2100FMF 2.1GB . 1632.86 Sledgel+lammer 2200FMF 2.1GB . 1972.74 SCSI JackHammer . 599.50 Hammer external enclosure . 511.23
1
Infinity 88MB Syquest Int
Input Devices —
ScanJet IICX 938.76
Logitech MouseMan 59.95 Logitech Trackman II 69.91

Input Devices —
ScanJet IICX PACKARD 938.76
Logitech MouseMan 59.95
ogitech Trackman II
Microtek
85T Slide Scanner936.25
ScanMaker II504.99
ScanMaker IIHR1039.38
ScanMaker IIXE876.11
ScanMaker Auto Doc Feeder379.48
Wacom
1x5 ArtPad ADB, with stylus135.39
3x8 Artz ADB, cordless pres stylus282.32
2x12 UD-series, cordless pres stylus483.65

TAT HEWLET	
DeskWriter 540	289.32
DeskWriter 560C	478.66
LaserJet 4ML	1016.51
LaserJet 4MP	1387.21
LaserJet 4M Plus	1957.13
LaserJet 4Si MX	4209.88
LaserJet 4MV	2836.09
DeskJet 1200C	1599,49
OKIDATA'	
Okidata 410e/PS 600 dpi 4 ppm	769.78
TEXAS INSTRUMENTS	
microLaser Pro 600 PS23	1197.02
microLaser Pro 600 PS65	1524.25
microLaser PowerPro 12ppm	1629.80

Power Ba	ickup —	
BC250	THEFTHE	04.07
BC400		138.91
BC500 LAN		173.09
BC600 LAN		238.37
	Smart Series-CAL	LI

### Memory

Simple Technology men	
PowerBook 180 4MB	CALL!
PowerBook 180 8MB	CALL
PowerBook 180 10MB	CALL
PowerBook 230 4MB	CALL!
PowerBook 230 8MB	CALL
PowerBook Duo 14MB	CALL
PowerBook Duo 20MB	CALL
PowerBook Duo 28MB	CALL
CDW carries the complete Sim configurations not lis	ple line-up. Call to sted here.

FAX (708) 465-6800

### Microtek APRICE DROP ScanMaker IISP

Affordable flatbed color scanner

• Resolution: 300 x 600 dpi (optical), 1200 x 1200 dpi (interpolated) • Selectable 24-bit color or 256 grayscale scanning ♦ Maximum document size: 8.5" x 11.6" ♦ DCR color calibration/correction system . Includes image-editing software . Includes SCSI system cable



MICROTEK Better Images Through Innovation.

ONLYI S529	89 CDW 38707	
	.48 CDW 42067	
	.98 CDW 49418	

# NEC

### **NEC MultiSync XE17**

Superior performance and innovative technology

✓ 17" diagonal (15.6" viewable) flat square CRT
✓ .28mm dot pitch, OptiClear" anti-reflective coating
✓ Dual dynamic beam focus for consistently sharp display
✓ Resolutions: 640 x 480, 832 x 624 and 1024 x 768

✓ Refresh rates: up to 75Hz ✓ Digital controls with on-screen menus ✓ Includes System 7.5-compatible MonitorManager" enhancement software: resolution, color and power management utilities ✓ Reduced magnetic field design, Energy Star compliant V Optional monitor lens for additional glare reduction

\$998.43 CDW 46002 ONLY !... \$539.50 CDW 46001 XE15 15".... \$1979.74 CDW 46003 Call CDW today for new NEC XP Series monitors

### SupraFAXModem™ 288

The SupraFAXModem™ 288 offers 28,800 bps data speeds with a maximum throughput of 115,200 bps! Supports V.34 and V.FC. You can also send or receive faxes at up to 14,400 bps.

Modem activity is displayed on an easy-to-read numeric panel and FLASH ROM is included for convenient firmware and feature upgrades. Silent Answer^M allows you to receive fax and voice calls on a single telephone line, and Caller  ${\rm ID}^*$  displays information about incoming calls. Includes FAXcilitate" 1.6, MicroPhone™ LT and CompuServe® Information Manager software, CCL scripts for ARA™, and cables.

ONLY \$204.63 CDW 49056

### Macromedia Freehand V5.0

The tool of choice for graphic designers, creative directors, production artists and illustrators worldwide.



CDW 50298

**Fractal Design** Painter V3.0

The power and flexibility to express yourself without limits



ONLY

\$299.98 CDW 47730

Adobe" Photoshop V3.0.1

Version upgrade

Think of it as a camera for your mind.

@1995 CDW Computer Centers, Inc.



MW1187

\$566.90 CDW 47958

Symantec Norton Utilities V3.1 No Macintosh is

complete without this comprehensive disk and file utility package.



\$95.64 CDW 46110

**CDW Computer Centers, Inc.** 1020 E. Lake Cook Rd. Buffalo Grove, IL 60089-1900 INTERNET: info@cdw.com

129.22

EtherMac SCSI-TP (PowerBook) 1 EtherMac SE-C Combo. Ether10-T transceiver RJ45/AUI. Ether10-T transceiver RJ45/AUI. LocalPath V1.0 8 user PhoneNET Connector DIN-8...

PhoneNET Connector DIN-8 10pk

Hardware, Peripherals and Software at Discount Prices

FREE TECHNICAL SUPPORT IS AVAILABLE TO CDW® CUSTOMERS!

WHY PAY RETAIL? CDW® SELLS FOR LESS AND SERVICES YOU BETTER!

# MAC BARGAINS

# **Buy with** Confidence

- A leading direct marketer
- of Mac products

  Over 2,500 products in stock

  Most orders ship the next day

  Our goal is 100% customer

satisfaction

Great Deals!

\$508 The most dazzling images ever seen from an ink jet printer! Stylus Color Ink Jet Printer

The Stylus Color Ink Jet Printer produces a very precise dot and can process over 16 million colors at an incredible



\$746

Only

Only

720x720 dpi resolution with designated paper (360x360 on normal bond) - virtually indistinguishable from a photographic image! Epson #19270

### ScanMaker IISP

The ScanMaker IISP features Dynamic Color Rendition™, the most accurate color cali-

bration and correction system available. In a single pass, the ScanMaker IISP captures 300x600 dpi and up to 16.8 million colors for original line art, graphics, photographs and text for optical character recognition applications. Microtek #06945

### Multiscan 17sf

Refresh rates of up to 75Hz
 "Super Fine" .25 aperture grill pitch

\$889 This 17" monitor





eliminate eye fatigue and conserve energy by dropping to 10% of the normal power drain in the suspend mode. Sony #02140

00032	Abacus Concepts Statview 4.0	\$446.98
00032	ACI US	3440.90
	The same of the sa	
94322	4D Chart 1.0	\$214.98
96355	4D First 1.2	\$94.98
99044	4D First 1.2	\$148.98
02648	4th Dimension 3.2 Version Upgrade	\$598.98
99043		\$58.98
	Adobe	
18894	Acrobat 2. for WorkGroups	\$999.00
93952	Acrobat 2.0	
95323	Acrobat Pro 2.0	\$376.98
98047	Aldus HomePublisher V2.0	\$41.98
95306	Aldus Paint & Publish	\$81.98
04190	Aldus SuperPaint V3.5	\$43.98
06711	DateBook Pro V4.0	\$43.98
94159	Design Kit for PageMaker 4.0 to 5.0	\$44.98
06263	Dimensions V2.0	\$121.98
93981	Extensis PageTools 1.0	\$82.98
95314	Fetch V1.2 Single User	\$93.98
05808	Illustrator V5.0-5.5 Upgrade	\$90.98
99491	Illustrator V5.5	\$361.00
04573	PageMaker V5.0	\$539.98
94177	PageMaker V5.0 PMac	\$559.98
00346	Persuasion V3.0	\$306.98
04042	Photoshop 3.0.	\$558.98
95341	Photoshop 3.0 Upgrade	\$136.98
05702	Premiere V3.0-4.0 Upgrade	\$71.98
04670	Premiere V4.0	\$499.98
03971	Streamline V3.0	\$124.98
06712	TouchBase Pro V4.0	\$43.98
03950	Type On Call 4.0	\$42.98
	AEC Software	745
03456	Fast Track Schedule 3.0	\$164.08
00.00	Aladdin	9104.30
98501	SitCom	261 00
05827	Stuffit Deluxe 3.5	\$60.08

Groupwise 4.1 Client/Admin 5Pk #92480

> Only \$512



	Alsoft	
00618	DiskExpress II 2.2	\$42.98
04543	Master Juggler 1.9	\$31.98
0.4600	Altsys	resta es
04537	Fontographer V4.1	
03552	Avery MacLabel Pro	\$43.98
	ASD	
03286	Fileguard	\$136.98
03323	FileGuard Office Pack 10 Users	\$794.98
	Broderbund	
06108	Arthur's Teachers Trouble CD	\$34.98
95461	Automan Atlas	\$54.09
99564	Carmen Sandiego/USA DLX	\$39.98
97732	Carmen Sandiego/World DLX CD-ROM	\$51.98
01015	Print Shop Deluxe	\$45.98
04197	The Playroom 2.0	\$29.98
97731	The Tortoise and the Hare	\$34.98
	Coere	
05161	OmniPage Direct V2.0	\$62.98
01005	OmniPage Pro V5.0	\$494.98
	Claris	
18052	Claris Draw	\$171.98
93424	Claris Works V3.0	\$117.98
03478	FileMaker Pro V2 1	\$87 Q8
05032	FileMaker Pro V2.1 Comp Upg Impact V1.0	\$184 98
99734	Impact V1.0	\$134.98
04140	MacProject Pro V1.5	\$364.98
06525	MacWrite Pro V1.5	\$88.98
18051	Organizer	\$44.98
06304	Retrieve It!	\$26.98
	Connectix	
05646	PowerBook Utilities	200 00
96785	RAM Doubler	
201.00		
	Corel	
95331	Corel GALLERY	\$31.98
Call	Corel GALLERY	
00203	Cricket Graph III	\$84.98
	Dontz	
06326	Diskfit Direct V1.0	\$28.98
04722	Diskfit Pro V1.1	\$68.98
02586	Diskfit Pro V1.1 Retrospect V2.1	\$135.98
04194	Retrospect w/ Remote 10pk	\$244.98
	Datawatch	
06533	Citadel w/ Shredder	\$68.98
02077	Virex V5.0.3	\$58.98
	Dataviz	
96907	MacLink Plus/PC Connect 8.0	\$112.00
96908	MacLink Plus/Translators Pro 8.0	\$110.90
30300		
	Delrina	100,000
97921	FaxPro for Mac V1.5	\$53.98
17271	Intermission Screen Saver	\$27.98
97938	Opus & Bill Screen Saver	\$28.98
	DeltaPoint	
04805		\$123.98
97780	DeltaGraph Pro 3.5 Comp. Upgr	\$74.98
	Deneba Deneba	
	Detlebo	444.744

	Millie's Math House	\$28.98
05992 94441	Sammy's Science House	\$32.98 \$32.98
98231	Sammy's Science House	\$36.98
93785	Thinkin Things II	\$39.98
	Electronic Arts	
97701	Chuck Yeager's Air Combat	\$34.98
00473	Golf PGA Tour II	\$37.98
96291	Recess in Greece	\$37.98 \$32.98
	Entertainment	
02785	After Dark V3.0	\$27.98
99583	Maxis A-Train w/ Construction Set	\$28.98
98221	Maxis El Fish	\$28.98
04721	Maxis SimAnt	\$28.98
98222	Mayie SimCity 2000	\$37.98
99216	Maxis SimCity 2000	\$22.98
03800	Maxis SimEarth	\$29.98
06848	Microprose Civilization	\$42.98
04053	More After Dark vol. 1	\$22.98
97733	MYST	\$45.98
97127	Paramount Jump Raven CD	\$37.98
97146	Paramount Lunicus CO	\$37.98
97145	Paramount Rock, Rap and Roll CD Passport Music Time V2.0	\$39.98
05518	Passport Music Time V2.0	\$89.98
95423	Prince of Persia II	\$34.98
06486	Psygnosis Lemmings	\$33.98
99237	Psygnosis More Lemmings	\$32.98
94267	Simpson's Screen Saver Star Trek Screen Saver	\$27,98
05934	Star Trek Screen Saver	\$27.98
06519	The Disney Screen Saver Collection	\$26.98
97197	Velocity Development Spectre VR Velocity Development Spectre VR CD	\$33.98 \$38.98
94593	velocity Development Spectre VR CD	
99236 94569	Virgin 7th Guest	\$43.99
94309	Virgin The 11th Hour.	PC 4 00
	Sequel to the 7th Guest	\$54.98
	Equilibrium	
96901	DeBabelizer Lite	\$82.98
98360	DeBabelizer Toolbox 1.6	\$249.98
	Fractal Design	
00665	Painter V3.0	\$318.98
93967	Painter V3.0 Upgrade	\$144.98
93994	Painter V3.0 Upgrade from PainterX2	\$89.98
00001	Tenne Technology	905.20
*****	Frame Technology	1
03582	FrameMaker V4.0	\$552.98
98039	FrameViewer V4.0	\$44.98
96800	Farallon Timbuktu Pro	\$126.98
A C C C C C C C C C C C C C C C C C C C	GDT Software	
00642	PowerPrint 2.5	\$94.98
94262	StyleScript	\$94.98
34505	atyleactipt	394.90
99506	Gryphon Morph V2.5	\$98.98
-	ueer t.	-
	HSC Software	
06668	HSC Kai's Power Tools V2.1	\$114.98
95335 95336	KPT Bryce 1.0  KPT Suite Imaging (Bryce & KPT)  KPT Convolver	\$114.98
95336	KP1 Suite Imaging (Bryce & KPT)	\$178.98
92240	KPT Convolver	\$118.98
98307	Bullseye Font Collection	\$59.98
00897	IdeaFisher V2.0	\$94.98
	Transaction of the same of the	
	Insignio	
03664	Access PC V3.0	\$78.98
06786	RapidCO	\$42.98
04541	Soft PC V3.0	\$98.98
06715	SOTT PC w/ Windows	\$296.98
98471	SoftWindows	\$289,98
	Intuit	
93222	QuickBook 3	\$119.98
04230	Quicken 5	\$39.98
	JIAN	William Comp
04257		***
01045	Biz Pan Builder 5.0	\$84.98 \$91.98
04996	Employee Manual Maker 3.0 Living Trust Builder 3.2	\$51.98
06827	Publicity Builder 2.0	\$84.98
00027		
	Kent Marsh	
00258	Folderbolt V1.02	\$68.98
		_
4	Peachtre	e
	Peachtre Accounti	



# Only

	Kodak	
94926	Photo CD Access Plus	\$35.98
06924	Shoebox	\$99.98
	Leader Technolgies	
05690	PowwerMerge 2.0	\$78.98
	Light Source	
93290	Colortron	\$1,192.00
00657	Ofoto 2.0	\$187.98
	Lotus	
00507	1-2-3 V1.1	\$274.98
00518	1-2-3 V1.1 Comp Upg	\$92.98
	MacPlay	
97125	AstroChase	\$34.98
99575	Battlechess Enhanced	\$44.98
97122	Castles II: Seige & Conquest	\$29.98
97149	Peter Gabriel XPLORA 1	\$44.98
95426	Star Trek 25th Anniversary CD	\$41.98
	Macromedia	
94180	FreeHand 5.0	\$384.98
92267	FreeHand 5.0 Competitive Upgrade	\$196.98
94182	FreeHand 5.0 Upgrade	\$124.98

99524	Macromedia Action! Bundle	
00839	Macromedia Director V4.0	å
06310 97770	MacroModel V1.5	ŝ
03619	SoundEdit 16 CD. Swivel 3D Professional	8
06840	Mac P & L	ě
00040	11-5/19/2017	ï
	Mainstay	
01159 93218	MacFlow 4.0Plan and Track	Š
99023		H
39053	ManagePro V2.0	ï
00200	Microsoft 1005	
99702 00227	Cinemania 1995	ij
04545	Excel V5.0 Excel V5.0 Ver Upg	ă
04293	Flight Simulator V4.0	ä
99696	FoxPro V2.6 Office V4.2	+
00427	PowerPoint V4.0	ĕ
04161	Project V3 0	ŝ
06184	Project V3.0 Upg	ž
04898	Project V3.0 Upg Word V6.0	i
00596	Word V6.0 Upg	ğ
22202	Microspot	
00818	MacPalette II	B
00011	Microtac Software	ï
95417	French Assistant	ļ
95416	German Assistant	
		÷
95415	Italian Assistant	
95418	Spanish Assistant	-
95418 99042 Ad	Spanish Assistant	The state of the s
95418 99042 Ad IIIu 5.4	Spanish Assistant. MYOB Accounting V5.0 w/Payroll  obe istrator 5 9491	ALM TO SECOND STATE OF THE PERSON STATE OF THE
95418 99042 Ad IIIu 5.4	Spanish Assistant. MYOB Accounting V5.0 w/Payroll  Obe ustrator	THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO
95418 99042 Ad Illi 5.1 #99	Spanish Assistant. MYOB Accounting V5.0 w/Payroll.  Obe istrator 5 9491 Only	ALM MANAGED IN CO.
95418 99042 Ad Illi 5.1 #99 00580 04191 99255	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Obe Istrator  9491  Only Adobe Illustrator  Now Software  Now Software Now Up-to-Date V3.0 Now Software Now Utilines V5.0  Omniscan.	THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO I
95418 99042 Ad Illt 5.1 #9 00580 04191 99255 04806	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Obe Istrator  Only  Adobe Illustrator  Now Software Now Up-to-Date V3.0  Now Software Now Up-to-Date V3.0  OmniScan.  Omp Plus 1.0	
95418 99042 Ad Illt 5.1 #9 00580 04191 99255 04806	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Obe Istrator  Only Adobe Illustrator  Now Software Now Software Now Up-to-Date V3.0 Now Software Now Up-to-Date V3.0 Org Plus 1.0 Org Plus 1.0 Peachtree Accounting	
95418 99042 Ad Illi 5.1 #99 00580 04191 99255	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Strator  Moss Strator  Now Software  Now Software Now Up-to-Date V3.0.  Now Software Now Utilities V5.0  OmniScan.  Org Plus 1.0  Peachtree Insight Accounting.	THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TW
95418 99042 Ad Illt 5.1 #9 00580 04191 99255 04806	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Obe Istrator  9491  Adobe Illustrator  Now Software Now Utilities V5.0  OmniScan. Org Plus 1.0. Org Plus 1.0. Peachtree Accounting Peachtree Insight Accounting Peachtree Insight Accounting Pixar	
95418 99042 Ad Illt 5.1 #99 00580 04191 99255 04806 072594 05745	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Obe Istrator  Only  Adobe Illustrator  Now Software Now Software Now Up-to-Date V3.0. OmniScan. Org Plus 1.0. Peachtree Accounting Peachtree Insignt Accounting Pixar Pixar Pixar Pixar	
95418 99042 Ad Illt 5.1 #99 00580 04191 99255 04806 072594 05745	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Strator  Most Strator  Adobe Illustrator  Now Software  Now Software Now Up-to-Date V3.0.  Now Software Now Utilities V5.0.  OmniScan.  Org Plus 1.0.  Peachtre Insight Accounting.  Peachtre Insight Accounting.  Pixar  Poar Typestry V2.1.  QuarkXPress V3.31	
95418 99042 Ad Illt 5.1 #99 00580 04191 99255 04806 072594 05745	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Obe Istrator  Only  Adobe Illustrator  Now Software Now Software Now Up-to-Date V3.0. Own Software Now Up-to-Date V3.0. OmniScan. Org Plus 1.0. Peachtree Accounting Peachtree Insight Accounting Pixar Typestry V2.1.  QuarkXPress V3.31  QuarkXPress V3.31  Photodex The Picture Factory Set 1.	
95418 99042 Ad Illi 5.1: #99 00580 04191 99255 04806 072594 05745 05668 04736	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Obe Istrator  Only  361  Now Software  Now Software  Now Software Now Up-to-Date V3.0.  Now Software Now Utilities V5.0  OmniScan.  Org Plus 1.0.  Peachtree Accounting  Peachtree Insight Accounting  Pixar  Pixar Pixar Poxar Typestry V2.1  QuarkXPress V3.31  Photodex  The Picture Factory Set 1  PhotoDisc	
95418 99042 Ad Illi 54, #92 00580 04191 092594 05745 05668 04736	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Obe Istrator  Only  Adobe Illustrator  Now Software Now Utilities V5.0  OmniScan. Ore Plus 1.0. Peachtree Insight Accounting Peachtree Accounting Peachtree Accounting Peachtree Power V2.1  QuarkXPress V3.31 Photodex The Picture Factory Set 1. Photoloisc Starter Kit.  Photoloisc Starter Kit.	
95418 99042 Add Illit 5.1, #92 00580 04191 992255 04806 02594 05745 05668 04736 96508	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Obe Istrator  Only  361  Now Software  Now Software  Now Software Now Up-to-Date V3.0.  Now Software Now Utilities V5.0  OmniScan.  Org Plus 1.0.  Peachtree Insight Accounting  Pixar  Pixar Pixar Poxar Typestry V2.1  QuarkXPress V3.31  Photodex  The Picture Factory Set 1  PhotoDisc Starter Kit.  PhotoDisc Starter Kit.	
95418 99042 Ad Illi 5.1: #99 00580 04191 99255 04806 072594 05745 05668 04736	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Obe Istrator  Only  Adobe Illustrator  Now Software Now Software Now Up-to-Date V3.0. Now Software Now Up-to-Date V3.0. OmniScan. Org Plus 1.0. Plus 1.0. Plus 1.0. Pixar Typestry V2.1  QuarkXPress V3.31 PhotoDisc PhotoDisc Starte Kit. Portfolio Software Day-to day Complete	
95418 99042 Add Illt 5.1, #99 00580 04191 05745 04806 02594 05745 05668 04736 96508 97349	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Obe Istrator  Only  Adobe Illustrator  Now Software Now Software Now Up-to-Date V3.0. Now Software Now Up-to-Date V3.0. OmniScan. Org Plus 1.0. Plus 1.0. Plus 1.0. Pixar Typestry V2.1  QuarkXPress V3.31 PhotoDisc PhotoDisc Starte Kit. Portfolio Software Day-to day Complete	
99418 99042 Add Illi 5.1 #9 00580 04191 99255 04806 04745 05745 05668 04736 99508 97349 94317 94328	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Obe Istrator  Only  Adobe Illustrator  Now Software  Now Software Now Up-to-Date V3.0  Now Software Now Up-to-Date V3.0  OmniScan.  Ore Plus 1.0  OmniScan.  Ore Plus 1.0  Ore Plus 1.0  Ore Plus 1.0  Ouark/Press V3.31  PhotoDics Captor  PhotoDics Captor  PhotoDics Captor  Day-to day Complete Org. bundle  Day-to day Complete  Ray Droom  addDepth with 25 free Funfonts	
99418 99042 Add Illi 5.1 #99 00580 04191 99255 05668 04736 996508 97349 94317 94328 994317 94328	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Adobe lilustrator  Now Software  Now Software  Now Software Now Up-to-Date V3.0.  Now Software Now Upilities V5.0  OmniScan.  Org Plus 1.0.  Peachtre Insight Accounting  Pixar  Porar Typestry V2.1  QuarkXPress V3.31  Photobics  Photobics Starter kit.  Portfolio Software  Day-to day Complete Org. bundle  Day-to day Complete	
99418 99042 Add Illi 5.1 #9 00580 04191 99255 04806 04745 05745 05668 04736 99508 97349 94317 94328	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Strator  Only  Adobe Illustrator  Now Software  Now Software Now Utilities V5.0  Omniscan. Oncy Pias 1.0  Peachtree Accounting  Peachtree Insight Accounting  Peachtree Insight Accounting  PhotoDisc Starter KI.  Portfolio Software  PhotoDisc Starter KI.  Portfolio Software  Bay-to day Complete Org. bundle  Day-to fay Software  Day-to	
99418 99042 Ad Illi 55.1 #99 90580 04191 99255 04806 04736 96508 97349 94317 94328 94317 94328	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Strator  Most Strator  Adobe Illustrator  Now Software  Now Software  Now Software Now Up-to-Date V3.0.  Now Software Now Utilities V5.0  OmniScan.  OmniScan.  Orig Plus 1.0.  Opeachire insight Accounting  Peachtre Accounting  Peachtre insight Accounting  Pixar  PhotoDisc  PhotoDisc Starter Kit.  Portfolio Software  Day-to day Complete Org. bundle  Day-to day Complete  Ray Dream  add Depth with 25 free FunFonts  Designer V3.0.  JAG II  Shana Corp.	
99418 99042 Add Illit 5.1 #99 00580 004191 992255 04806 05745 05745 05745 99508 97749 94317 94317 94317 94317	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Obe Istrator  Only  Adobe Illustrator  Now Software  Now Software  Now Software Now Up-to-Date V3.0  Wow Software Now Up-to-Date V3.0  OmniScan  Orr Plus 1.0  Peachtree Accounting  Pixar  Poar Typestry V2.1  QuarkXPress V3.31  PhotoDisc  PhotoDisc Starter Kit.  Portfolio Software  Day-to day Complete Org, bundle  Day-to day Complete Org, bund	
99418 99042 Ad Illi 5-1: #99 90255 00580 04191 99255 05668 04736 96508 97349 94317 94328 97768 00441 04150	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll.  Strator  Most Strator  Adobe Illustrator  Now Software  Now Software Now Up-to-Date V3.0.  Now Software Now Utilities V5.0.  OmniScan.  Org Plus 1.0.  Peachtre insight Accounting  Peachtre Accounting  Peachtre Accounting  Peachtre insight Accounting  Pixar  Photodex  The Picture Factory Set 1.  PhotoDisc Starter Kit.  Portfolio Software  Day-to day Complete Org. bundle  Day-to day Complete  Ray Droom  Add Depth with 25 free FunFonts  Designer V3.0.  Shana Corp.  Informed Database Extensions 1.0.  Informed Database Extensions 1.0.  Informed Database Extensions 1.0.  Informed Database Extensions 1.0.	
99418 99042 Add Illit 5.1 #99 00580 004191 992255 04806 05745 05745 05745 99508 97749 94317 94317 94317 94317	Spanish Assistant.  MYOB Accounting V5.0 w/Payroll  Obe Istrator  Only  Adobe Illustrator  Now Software  Now Software  Now Software Now Up-to-Date V3.0  Wow Software Now Up-to-Date V3.0  OmniScan  Orr Plus 1.0  Peachtree Accounting  Pixar  Poar Typestry V2.1  QuarkXPress V3.31  PhotoDisc  PhotoDisc Starter Kit.  Portfolio Software  Day-to day Complete Org, bundle  Day-to day Complete Org, bund	

Specular International

Spectrum Holobyte Falcon MC.....

Iron Helix CD.

Collage ...... Infini-D 2.6...

Logomotion

ACTI V2.0.

06997 04413

94986

ACTI V2.0 Disk Doubler Pro V1.1 DiskLock V3.0 MacTools 4.0 Pro Norton Utilities V3.1 SAM 4.0 Suitcase V2.1

Video Director 1.5...

WordPerfect 3.1 WordPerfect V3.1 Ver Upg... Grammatik V6.0

WillMaker 5...

Software Ventures MicroPhone Pro

ClickArt Artistry & Borders ........ ClickArt Incredible Image Pak CD

Sierra On-Line

Why get slower ground ship

# For the Best Deals Around! \_800-619-9091

אכ	ITORS	
	Sony	
6	Multiscan 15sf	\$444.98
6 9 0	Multiscan 17se1	\$967.98
0	Multiscan 17sf	\$889.00
7	Multiscan 20se	
7		\$329.98
	radus	
5	20GS 20° Monochrome	\$794.98
5	Full Page Display - Grayscale	\$489.98
8	Intellicolor 20e Display	\$1,952.98
6	Precision Color 21	\$2,089,00
3	PrecisionColor 17° Color	\$999.98
	NEC	HALLOS CO.
6		\$227.00
7	NEC MultiSync 2V 14" NEC MultiSync 3V 15"	\$465 08
	NEC XE 21 21" Color Mtr	C1 000 00
7	NEC XE15 15" Color Mtr	\$545.00
	NEG VELT 13 Color Mil	2040.90
3	NEC XE17 17" Color Mtr NEC XP 15 15" Color Mtr	\$990.98
	NEG AP 10 10 GOIOF MIT	3010.90
1	NEC XP 17 17" Color Mtr NEC XP 21 21" Color Mtr	\$1,235.00
2	NEG XP 21 21 Color Mtr	52,448,98
Œ	O/GRAPHICS BOARDS	
	radius	W-120-W-
3	LeMans GT	\$1,455.00
)	Photo Engine	\$849.98
3	Precision Color 8XJ 8-bit	\$454.98
2	PrecisionColor Pro 24X	\$1,070.00
5	PrecisionColor Pro 24XK	\$797.98
1	PrecisionColor Pro 24XP	\$443.98
3	Video Vision	\$1,511.98
3	Video Vision Studio 2.0	\$3,959.00
	SUPERMAC.	
8	Power DSP Upgrade	\$529.98
3	Spectrum 24 Series V	\$749.00
9	Spectrum Power 1152	\$1,200.00
18	Spigot Power AV	\$799.98
	Thunder 24 V2.0	\$1,534.88
3	Thunder II GX 1152	\$2,089.00
16	Thunder II GX Upgrade	\$824.98
1	Thunder II Upgrade	\$497.98
7	Video Spigot II Tape	\$729.98
C	ELERATORS	
	DAYSTAR	
В	33MHz Univ Turbo 040 128K Cache	\$619.98
7	33MHz Univ Turbo 040i 128K Cache	\$647.98
2	33MHz Value 040 FPU 128K Cache	
)	33MHz Value 040i 128K Cache	\$647.98
}	40MHz Univ Turbo 040 128K Cache	\$889.98
3	40MHz Value 040 FPU 128K Cache	\$989.98
	Charger	\$499.98
2	Charger Plus	\$619.98
	Image 040 Imaging Xel	
)	PowerPro 601 66MHz Xel	\$1,299.00
	Dawes Den CO1 COMMILE Val	P4 000 00

Image 040 Imaging Xel   St.	\$69.9
	\$52.9 \$52.9 \$54.9 \$54.9 \$23.9 \$327.9 \$47.9 \$69.9
Dought   D	\$52.9 \$54.9 \$54.9 \$54.9 \$27.9 \$47.9 \$69.9
19	\$52.9 \$54.9 \$54.9 \$23.9 \$27.9 \$47.9 \$69.9
TriendyNet Adapter	154.9 223.9 327.9 347.9 869.9
101 FriendyNet Adapter	154.9 223.9 327.9 347.9 869.9
101 FriendyNet Adapter	154.9 223.9 327.9 347.9 869.9
Asante Print (10/T/K)   State	223.9 327.9 347.9 569.9
Asante Print (10/T/K)   State	327.9 347.9 869.9
42 Asante Print 8 (AUI/10T).  5 MacCorn LC 10T.  47 MacCorn LC 10T/TN.  52 MacCorn LC 10T/TN.  53 MacCorn LC 10T/TN.  54 MacCorn LC 10T/TN.  55 MacCorn LC 10T/TN.  56 MacCorn HuBus 10T/TK.  57 MacCorn HuBus 10T/TK.  58 MacCorn HuBus 10T/TK.  59 MacCorn HuBus 10T/TK.  50 Mc + S01664 IISI & SE/30 (TK/TN).  51 Mc-IE64 Mac II & Performa 600 (TK/TN).  52 Mc-IE64 Mac II & Performa 600 (TK/TN).  53 Mc3ISI IISI & SE/30 (TK/TN/TO).  54 McCLCIII LC, LCII, LCIII (TW/TO).  55 McLCTIII LC, LCII, LCIII (TW/TO).  56 MCLCTOTIII LC, LCII, LCIII (TV).  57 MCLCTOTIII LC, LCII, LCIII (TV).  58 Micro EN/SC for PowerBooks 10T.  59 Micro EN/SC for PowerBooks 10T/TN.  50 McThy Mint EN/SC for PowerBooks 10T/TN.  50 Mint EN/SC for PowerBooks 10T/	347.9 \$69.9
MacCori-LC 10T	\$69.9
MacCon-ILCTN	
MacCon-ILCTN	165.9
MacCon-NuBus 1017/TK   MacCon-NuBus 1017/TK   Mac + 001664 IIISI & SE/30 (TK/TN)   Mc + 001664 IISI & SE/30 (TK/TN)   Mc-IE64 Mac III & Performa 600 (TK/T0)	109.9
44 MacCon-I NuBus TN/TK.  47 MC + 301664 IISI & SE/30 (TK/TN).  48 MC+301674 IISI & SE/30 (TK/TN).  49 MC+301674 IISI & SE/30 (TK/TOT).  40 MC+301674 Mac II & Performa 600 (TK/TN).  41 MC-IIE64 Mac II & Performa 600 (TK/TN).  53 MC-3161 IISI & SE/30 (TK/TN/107).  54 MC-3161 IISI & SE/30 (TK/TN/107).  55 MC-3161 IISI & SE/30 (TK/TN/107).  56 MC-3161 IISI & SE/30 (TK/TN/107).  57 MC-3161 Mac II & Performa 600 (TK/TK/TOT).  58 MC-3161 IISI & SE/30 (TK/TN/107).  59 MC-3161 IISI & SE/30 (TK/TN/107).  50 MC-3161 IISI & SE/30 (TK/TN/107).  51 MC-3161 IISI & SE/30 (TK/TN/107).  52 MC-3161 IISI & SE/30 (TK/TN/107).  53 MC-3161 IISI & SE/30 (TK/TN/107).  54 MC-3161 IISI & SE/30 (TK/TN/107).  55 MC-3161 IISI IISI K SE/30 (TK/TN/107).  56 MC-3161 IISI IISI K SE/30 (TK/TN/107).  57 MC-3161 IISI IISI K SE/30 (TK/TN/107).  58 MC-3161 IISI IISI K SE/30 (TK/TN/107).  59 MC-3161 IISI IISI K SE/30 (TK/TN/107).  50 MC-3161 IISI IISI K SE/30 (TK/TN/107).  50 MC-3161 IISI IISI IISI IISI II	89.9
47 MC + 30(E64 IISI & SE/30 (TK/TN)) \$ 46 MC-30(E64 IISI & SE/30 (TK/TN)) \$ 42 MC-IIE64 Mac II & Performa 600 (TK/T0) \$ 41 MC-IIE64 Mac II & Performa 600 (TK/T0) \$ 41 MC-IIE64 Mac II & Performa 600 (TK/T0) \$ 43 MC3ISI SISI & SE/30 (TK/TN/T0) \$ 45 MC3ISI SISI & SE/30 (TK/TN/T0) \$ 46 MC3ISI SISI & SE/30 (TK/TN/T0) \$ 47 MC3ISI Mac II & Performa 600 (TK/TK/T0) \$ 48 MC3ISI SISI & SE/30 (TK/TN/T0) \$ 49 MC1CTOTIII LC, LCII, LCIII (TIV) \$ 40 MC1CTOTIII LC, LCII, LCIII (TV) \$ 40 MINISTER SISI SISI SISI SISI SISI SISI SISI SI	117.9
46 MC-30IET64 IISI & SE/30 (TK/10T) . \$ 4 MC-IEI64 Mac II & Performa 600 (TK/10T) . \$ 4 MC-IEI64 Mac II & Performa 600 (TK/10T) . \$ 50 MC-LCIII LC, LCII, LCIII (TN/10T) . \$ 33 MC3ISI IISI & SE/30 (TK/TN/10T) . \$ 11 MC3INS IISI & SE/30 (TK/TN/10T) . \$ 12 MC1CT0TIII LC, LCII, LCIII (TN) . \$ 13 MCC ENTO THE CONTROL (TN) . \$ 14 MC1CT0TIII LC, LCII, LCIII (TN) . \$ 15 MC1CT0TIII LC, LCII, LCIII (TN) . \$ 17 MINTENSC for PowerBooks (10T) . \$ 18 MINTENSC for PowerBooks (10T) . \$ 18 MINTENSC for PowerBooks (10T) . \$ 19 Micro ENSC for PowerBooks (10T) . \$ 14 MINTENSC for PowerBooks (10T) . \$ 14 MINTENSC for PowerBooks (10T) . \$ 15 MINTENSC for PowerBooks (10T) . \$ 16 MINTENSC for PowerBooks (10T) . \$ 17 MINTENSC for PowerBooks (10T) . \$ 18 MINTENSC for PowerBooks (10T) . \$ 19 MINTENSC for PowerBooks (10T) . \$ 10 MINTENSC for	147.9
42 MC-IIE64 Mac II & Performa 600 (TK/10T) at MC-IIE64 Mac II & Performa 600 (TK/10T) bt MC-IE64 Mac II & Performa 600 (TK/TM) 50 MC-IEII LC, LCII, LCIII (TW/10T) 51 MC-IEII LS, LESS Q (TK/TM/10T) 51 MC-IEII LS, LESS Q (TK/TM/10T) 52 MC-IEII LS, LESS Q (TK/TM/10T) 52 MC-IEII LS, LCII, LCIII (TIV) 53 MC-IEII LS, LCIII (LCIII (LCIII TW) 54 MC-IEII LS, LCIII (TW) 54 MC-IEII LS, LCIII (TW) 55 MC-IEII LS, LCIII (TW) 56 MC-IEII LS, LCIII (TW) 57 MC-IEII LS, LCIII (TW) 58 MC-IEII LS, LCIII LS, LCIII (TW) 58 MC-IEII LS, LCIII LS, LCIII (TW) 58 MC-IEII LS, LCIII LS, LCIII (TW) 59 MC-IEII LS, LCIII LS,	
(TK/107)   S	
TK/TN    S	153.9
MG-LC/III LC, LCII LCIII (TN/10T)   \$3	
MCSIIS II St. 6 SE-20 (IKVINOT)   S	
MCSIIS II St. 6 SE-20 (IKVINOT)   S	184.9
TM/TK/10T	194.9
18	11/5 %
18	198.9
18	155.9
117 Mini ENSC for PowerBooks (1017).  18 Mini ENSC for PowerBooks (1017N).  140 NetExender Hub (AU/I/101).  141 NetExender Hub FI (AU/I/101).  150 Thick FriendlyNet Media Adapter.  151 Dayna  152 Dayna  153 Dayna Dorket SCSI I ink M (1077N).	155.9
117 Mini ENSC for PowerBooks (1017).  18 Mini ENSC for PowerBooks (1017N).  140 NetExender Hub (AU/I/101).  141 NetExender Hub FI (AU/I/101).  150 Thick FriendlyNet Media Adapter.  151 Dayna  152 Dayna  153 Dayna Dorket SCSI I ink M (1077N).	270.0
188 Mini ENISC for PowerBooks (10/TN). \$ 40 NetExender Hub (AUI/10T). \$ 41 NetExender Hub PN (AAUI/10T). \$ 600 Thick FriendlyNet Media Adapter. \$ 99 Thin FriendlyNet Media Adapter. \$ 90 Thin FriendlyNet Media Adapter. \$ 800 Dayma Pocket SCSI I I IN M (10/T/N). \$	100.0
NetExender Hub (AUV10T)     S     Hat NetExtender Hub FN (AAUV10T)     S     Thick FriendlyNet Media Adapter     Thin FriendlyNet Media Adapter     Dayna	228 0
Thin FriendlyNet Media Adapter  Dayna  R26 Dayna Pocket SCS Link M (10T/TN)	119 9
Thin FriendlyNet Media Adapter  Dayna  R26 Dayna Pocket SCS Link M (10T/TN)	129 9
Thin FriendlyNet Media Adapter  Dayna  R26 Dayna Pocket SCS Link M (10T/TN)	\$59 9
Dayna Parket SCSI Link M (10T/TN) S	\$54.9
326 Dayna Pocket SCSI Link M (10T/TN)\$	
R25 Dayna Pocket SCSLLink T (10T) S	287.9
	235.9
114 DaynaLINK Mobile Access Server f/ARA \$1.	998.9
718 DaynaPORT E/II (TN/TK) DP0200	114.9
V28 DaynaPORT E/II-3 (101/1K/TN) DP0202	159.9
595 DaynaPORT E/II-T (10T/TK) DP0201	107.9
DaynaPORT E/LC (TN) DP0400	107.9
404 DaynaPORT E/LC-M (10T/TN) DP0403 \$	157.9
190 DaynaPORT SCSI Link-3 (10T/TK/TN) I/ PB_S	299.9
488 DaynaPORT SCSI Link-3 DP0802	278.9
405 DaynaPORT SI/30-3 (10T/TK/TN) DP0513.\$ 401 DaynaPORT SI/30T (10T/TK) DP0511\$	109.5
962 DaynaSTAR Hub-24	868.9
	147.9
	689.9
117 DaynaSTAR Stack 24S1	189 6
	\$55.9
280 EasyNet Transceiver TN/AAUI	\$55.9
595 EtherPrint 3 (10T/TK/TN)	353.9
622 EtherPrint 3 Plus (10T/TK/TN)	469.9
562 Mini EtherPrint Plus 10T/TN S	
559 Mini EtherPrint-T 10T	429.5
560 Mini EtherPrint-T 10T/TN	349.5

93561	Mini EtherPrint-T Plus 10T	\$419.98
30001	:: Farallon*	
93588	Ether 10T Starlet/16	\$568.98
93587	Ether 10T Ctsrlet/4	6468 00
05693 03333	Ether 10T Starlet/8 Ether 10T Starlet/8 Ether10-T StarController Ether10-T Transceiver (AAUI/10T)	\$1,849.00
04307 03475	Ether10-T Transceiver (AAUI/10T)	\$51.98
98848	Ether10-T Transceiver (AUI/10T) EtherThin Transceiver (AUI/TN) EtherThin Transceiver (AUI/TN)	\$61.98
98849 98409	EtherThin Transceiver (AUI/TN) EtherWave AAUI Transceiver	\$61.98 \$95.98
98408	FtherWave Attl Transceiver	\$92.89
98412 98411	EtherWave LC Card	\$167.98 \$169.98
98414 98413	EtharMasia PR or Sint-lace Man Adantar	\$279.98 \$189.98
98410	EtherWave PC ISA Card	\$279.98
04160 00955	PhoneNET Connector 50pk PN350 PhoneNET DB-9 PN309	\$798.98 \$34.00
00828	PhoneNET DIN-8 10pk PN310 PhoneNET DIN-8 PN308	\$184.98
00832 02779	PhoneNET DIN-8 PN308 PhoneNET Star Connector PN301	\$26.98 \$14.98
CON		
	Global Village	
95206 95207	One World Fax 1 Line, Localtalk One World Fax 2 Line, Ethernet One World Remote Acc 2 Line, Ethernet	\$839.98
95209	One World Remote Acc 2 Line, Ethernet	\$1,598.00
05686 05684	PowerPort Bronze PowerPort Gold	\$89.98 \$233.98
98182	PowerPort/Mercury for PowerBook 1XX PowerPort/Mercury for PowerBook Duo	\$312.98 \$312.98
98183 06267	PowerPort/Mercury for PowerBook Duo TelePort Gold	\$312.98 \$216.98
93748	TelePort Gold II	\$124.98
99307 98181	TelePort/Bronze II	\$92.98
30101	Supra	
93736	Supra Express 144 Plus Supra FaxModern 144LC Ext -Mac	\$98.98
99308 06865	Sunra FavModem 144PR Int "PowerRoo	C205 98
96582	Supra FaxModem 288 Ext - Mac Supra FaxModem 288 Int - Mac PB Supra FaxModem V.32BIS (MC)	\$244.98
96583 00413	Supra FaxModem V.32BIS (MC)	\$204.90
	w/Sft Cable	\$181.98
	<b>E-Robotics</b>	
93701	Mac & Fax Sportster 14.4	\$128.98
92953	Mac & Fax Sportster 28.8 V.34	\$246.98
STO		
	MEGA° Makers of Bernoulli	
00000	Makers of Bernoulli	2450.00
93320 96810	Iomega MacTransportable 230 Iomega MacTransportable 90 Pro	\$452.98 \$280.98
96811	lomega MacTransportable 90 Pro	\$421.98
00.400	Pinnacle Micro	64 070 00
92403 93304	RCD 1000 Recordable CD-RomRCD 202 Recordable CD-ROM	\$1,878.00 \$2,448.00
93302 93301	RCD 202 Recordable CD-ROM Sierra 1.3GB Optical Tahoe 230MB Optical	\$2,779.00
93301	PII	3004.50
94112	Infinity 230MB Optical 3.5"	\$1,068.00
96821 96823	Infinity MAX Optical 5.25 1.3GB	\$3,188.00 \$549.00
95364	Infinity 200 Removable Drive	\$638.98
200	FWB	10/10/20
06271 05476	CD-ROM Tookit	\$47.98 \$47.98
00555	Hard Disk Toolkit - Personal Ed Hard Disk Toolkit	\$122.98
94121	SCSI JackHammer	\$597.98
93569	LaCie  Q Drive External 170MB	\$297.98
03695	Q Drive External 270MB	\$337.98
03697 03698	Q Drive External 340MB Q Drive External 540MB	\$387.98 \$442.98
03949	Q Drive External 1080MB	\$885.98
93567 93564	Q Drive External 1400MB PocketDrive 85MB	\$1,059.00 \$212.98
93565	PocketDrive 170MB	\$341.98
93566	PocketDrive 256MB	\$424.98
95346	Apple Hard Drives 160MB Ext HD	\$243.98
93593	270MB Ext HD	\$383.98
95348 95338	340MB Ext HD	\$423,98
93568	1080MB Ext HD	\$919.98
	nal HD	0047.00
06733 97960	Quantum 170MB	\$217.98
06941	Quantum 340MB	\$287.98
99929 06736	Quantum 1GB	\$845.98 \$997.98
97991	Seagate 2.1GB Barracuda	\$1,795.00
Exte	rnal HD	\$286.98
06728 97961	Quantum 170M8	\$307.98
06942	Quantum 340MB	\$357.98
01108 99927	Quantum 540MB	\$406.98 \$797.98
94065	Seagate 2.1 GB Barracuda	\$1,989.00
Rem 06219	Ovable HD Suffuget AMR w/o cartridge	\$107.00
	SyQuest 44MB w/o cartridge	\$197.98 \$314.98
	The second secon	0004.00
06538 99930	SyQuest 105MB w/o cartridge	\$324.98
06538	SyQuest 200MB w/o cartridge	\$486.98 \$496.98
06538 99930 01142 97989 94066	SyQuest 105MB w/o cartridge SyQuest 200MB w/o cartridge SyQuest 270MB w/o cartridge 128MB Magneto Optical  JT DEV/GES:	\$486.98

02103	StudioScan II	\$699.98 \$865.00
05044	Calcomp	e224 00
95241 95242	Drawing State 12x12 Cordless 4B Cursor Drawing State 12x12 Cordless 6B Cursor	\$244.98
98251	Drawing Slate 12x12 w/ Pressure Pen	\$224.98
95243 95244	Drawing Slate 12x18 Cordless 48 Cursor	\$369.98
93495	Drawing State 12x12 of Pressure Pen Drawing State 12x18 Cordless 4B Cursor Drawing State 12x18 Cordless 6B Cursor Drawing State 12x18 w/ Pressure Pen Drawing State 12x18 w/ Pressure Pen Drawing State 12x18 w/ Pressure Pen	\$499.98
93496	Drawing State 6x8 W/ Fractal Family 5.0.	.3403.30
99380	Drawing State 6x9 w/ Pressure Pen Hewlett Packard	\$189.98
92610	ScanJet 3P	\$485.98
92608	ScanJet IIP	\$348.98
92601	ScanJet IICX	\$936.98
00004	MICROTEK	\$374.98
06024 06251	ScanMaker IIG	\$499.98
06945	ScanMaker IISP	\$746.00
06252 01120	ScanMaker IIXE ScanMaker IIHR	\$874.98 1,036.00
06903	35T Slide Scanner	\$934.98
01122	ScanMaker III	2,399.98 \$359.98
	Logitech	
04258	MouseMan	\$61.98
95612	TrackMan II	\$68.98
	RELISYS	
97971	Avec 2400LE	\$568.98
01176	Reli 4816T w/Photoshop\$	1,349.98
01170		1,899.98
	UMAX	
06905	The Magic of Color* UC 630 w.Photoshop LE	\$589.98
06904	UC 840 w. Full Photoshop	\$894.98
01179 02175	Vista S6	\$758.98 1,097.98
	Wacom	
03677	12x12 Std, Corldess Pressure Stylus	\$659.98
03803	12x18 Electrostatic.	1,051.00
92687	ArtPad 4x5 ADB Graphics Tablet	\$149.98
92686	ArtZ ADB w/ Fractal Painter 3.0	\$614.98
CD-R	OM/MULTIMEDIA	
10770	NEC TAND DIVE OD DOM	\$384.98
19728 19726	NEC 3XP Plus CD-ROM	\$223.98
19724	NEC 4Xe CD Rom Drive	\$479.98
98134 01199	Apple Design Powered Speakers Performantz Mini 2X CD-ROM	\$154.98 \$171.98
13166	Sony SRS-D2K Speakers w/ Subwoofer	\$134.98
02168	Yamaha M10 Shielded Speakers	\$64.98
PRIN	CoStar	
95505		\$149.98
95505 95506	LabelWriter XL	\$149.98 \$228.98
95506	LabelWriter XL	\$228.98
	LabelWriter XL	
95506	LabelWriter XL	\$228.98
95506 19270 92619	LabelWriter XL. Plus.  Epson Stylus Color Ink Jet Printer.  HEWLETT HP DESKWriter 320	\$228.98 .\$508.00 .\$309.98
95506 19270 92619 92617	LabelWriter XI. LabelWriter XI. Plus  Epson  Stylus Color ink Jet Printer  PACKARD  HP DeskWriter 320  HP DeskWriter 540	\$228.98 .\$508.00 .\$309.98 .\$295.98
95506 19270 92619 92617 95522 21151	LabelWriter XL LabelWriter XL Plus  Epson  Stylus Color Ink Jet Printer  PACKARD  HP DesKWriter 540	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98
95506 19270 92619 92617 95522 21151 21155	LabelWriter XL LabelWriter XL Plus  Epson  Stylus Color Ink Jet Printer  PACKARD  HP DesKWriter 540	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98
95506 19270 92619 92617 95522 21151	LabelWriter XL LabelWriter XL Plus  Epson  Stylus Color Ink Jet Printer  PACKARD  HP DesKWriter 540	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98
95506 19270 92619 92617 95522 21151 21155 21157	LabelWriter XL LabelWriter XL Plus  Epson  Stylus Color Ink Jet Printer  PACKARD  HP DesKWriter 540	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98
95506 19270 92619 92617 95522 21151 21155 21157 21159	LabelWriter XL LabelWriter XL Plus  Epson  Stylus Color Ink Jet Printer  LPP DeskWriter 320  HP DeskWriter 540  HP DeskWriter 560  HP LaserJet 4MI  HP LaserJet 4MI  HP LaserJet 4MI  LaserJet 540  La	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 \$1,014.00 \$1,974.00 \$4,197.00 \$2,834.00
95506 19270 92619 92617 95522 21151 21155 21157 21159	LabelWriter XL LabelWriter XL Plus  Epson  Stylus Color Ink Jet Printer  EPD HEWLETT PACKARD  HP DeskWriter 540 HP DeskWriter 540 HP LaserJet 4MP Plus HP LaserJet 4MP Plus  MicroWriter PS03 MicroLaser Pro 800 PS23 MicroLaser Pro 800 PS23 MicroLaser Pro 800 PS25	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 1,014.00 1,974.00 4,197.00 2,834.00 \$599.98 1,194.98
92619 92619 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 19899	LabelWriter XI. LabelWriter XI. Plus  Epson Stylus Color Ink Jet Printer.  Epson Stylus Color Ink Jet Printer.  Epson HEWLETT PLACKARD HP DeskWriter 540 HP DeskWriter 560 HP LaserJet 4MI. HP LaserJet 4MI S. HP LaserJet 4SI MX HP LaserJet 4WI S.  Texas Instruments MicroWriter PS23 MicroLaser Pro 600 PS23 MicroLaser Pro 600 PS55 MicroLaser Pro 600 PS55 MicroLaser Pro 600 PS55	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 \$1,014.00 \$1,974.00 \$4,197.00 \$2,834.00
92619 92619 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 19899	LabelWriter XI. LabelWriter XI. Plus  Epson  Stylus Color Ink Jet Printer.  Epson  Stylus Color Ink Jet Printer.  Epson  HP DeskWriter 320  HP DeskWriter 340  HP DeskWriter 540  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  METON Instruments  MicroWriter PS23  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS85	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 1,014.00 1,974.00 2,834.00 \$599.98 1,194.98
92506 19270 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 19399	LabelWriter XL LabelWriter XL Plus  Fpson  Stylus Color Ink Jet Printer  PACKARD  HP DeskWriter 320  HP DeskWriter 540  HP DeskWriter 560C  HP LaserJet 4ML  HP LaserJet 4ML  HP LaserJet 4MS  MICROLaser Pro 800 PS23  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS25	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 \$1,014.00 \$1,974.00 44,197.00 2,834.00 \$599.98 11,194.98 11,521.00 11,627.00
95506 19270 92619 92617 95522 21151 21155 21157 21159 14319 14320 19399 POW	LabelWriter XI. LabelWriter XI. Plus  Epson  Stylus Color Ink Jet Printer  EP ALKARD  HP DeskWriter 320  HP DeskWriter 340  HP DeskWriter 540  HP LaserJet 4MI  HP LaserJet 4MI  HP LaserJet 4MI  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS25  MicroLaser Power Pro  APC  APC  APC  APC  APC  APC  APC  AP	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 1,014.00 1,974.00 2,834.00 \$599.98 1,194.98
95506 19270 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 19399 POW	LabelWriter XI. LabelWriter XI. Plus  Epson  Stylus Color Ink Jet Printer  EPD HEWLETT  PACKARD  HP DeskWriter 320  HP DeskWriter 340  HP DeskWriter 540  HP LaserJet 4MI  PL LaserJet 4MI  IP LaserJet 4MI  EVAN Instruments  MicroMarer Pro 800 PS23  MicroLaser Pro 800 PS85  MicroLaser Pro 800 PS85  MicroLaser Pro 800 PS85  MicroLaser Pro 800 PS85  APS Personal Surge Arrest w/Phone  APS Personal Surge Arrest w/Phone  BackUos 250	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 \$1,014.00 \$1,974.00 \$4,197.00 \$2,834.00 \$1,194.98 \$1,521.00 \$1,627.00
92506 19270 92619 92617 95522 21155 21155 21157 21159 06859 14319 14329 19399 POW 94396 94395 07150	LabelWriter XI.  LabelWriter XI. Plus  Fpson  Stylus Color Ink Jet Printer.  FPD PACKARD  HP DeskWriter 520  HP DeskWriter 500  HP DeskWriter 500  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS24  MicroLaser Pro 800 PS25  MicroLaser Pro 800 PS25  MicroLaser Pro 800 PS25  MicroLaser Pro 800 PS25  MicroLaser Pros 80	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 1,014.00 1,974.00 2,834.00 \$599.98 1,194.98 1,194.98 1,521.00 1,527.00
95506 19270 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 19399 POW	LabelWriter XI.  LabelWriter XI. Plus  Fpson  Stylus Color Ink Jet Printer.  FPD  HEWLETT PACKARD  HP DeskWriter 500  HP DeskWriter 500  HP JaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS85  MicroLaser P	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 1,014.00 1,974.00 2,834.00 \$599.98 11,194.98 11,521.00 11,627.00
92506 19270 92619 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 19899 POW 94396 94395 07150 99364 11651	LabelWriter XI.  LabelWriter XI. Plus  Fpson  Stylus Color Ink Jet Printer.  FPD  HEWLETT PACKARD  HP DeskWriter 500  HP DeskWriter 500  HP JaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS85  MicroLaser P	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 11,014.00 11,974.00 41,197.00 2,834.00 \$599.98 \$1,194.98 11,521.00 11,627.00 \$1,194.98 \$1,521.00 11,627.00
92619 92619 92619 92619 92522 21151 21155 21157 21159 06859 143120 14320 14320 14396 94396 94396 94396 94396 94396 94396 94396 94396 94396 94396 966661	LabelWriter XI.  LabelWriter XI. Plus  Fpson  Stylus Color Ink Jet Printer.  FPD  HEWLETT PACKARD  HP DeskWriter 500  HP DeskWriter 500  HP JaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  MicroLaser Pro 800 PS23  MicroLaser P	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 11,014.00 11,974.00 41,197.00 2,834.00 \$599.98 \$1,194.98 11,521.00 11,627.00 \$1,194.98 \$1,521.00 11,627.00
92506 19270 92619 92619 95522 21151 21155 21157 21159 06859 14319 14320 14399 POW 94396 94395 07150 99384 11651	LabelWriter XI.  LabelWriter XI. Plus  Fpson  Stylus Color Ink Jet Printer.  FPD PACKARD  HP DeskWriter 500  HP DeskWriter 500  HP DeskWriter 500  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  MICTOLaser Pro 800 PS23  MicroLaser Pro 800 P	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 \$1,014.00 \$1,974.00 \$4,197.00 \$2,834.00 \$1,521
92619 92619 92619 92619 92522 21151 21155 21157 21159 06859 143120 14320 14320 14396 94396 94396 94396 94396 94396 94396 94396 94396 94396 94396 966661	LabelWriter XI. LabelWriter XI. Plus  Epson  Stylus Color Ink Jet Printer.  EP PACKARD  HP DeskWriter 320  HP DeskWriter 500  HP DeskWriter 500  HP Laserdet 4MI.  HP Laserdet 4MI.  HP Laserdet 4MI.  HP Laserdet 4MI.  Microlaser Pro 800 PS85  APS Personal Surge Arrest wPhone BackUps 230  BackUps 230  BackUps 240  BackUps 250  BackUps 240  BackUps 250  Trip Lite BC 250 UPS  Trip Lite BC 250 UPS  Trip Lite BC 500 UPS	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 11,014.00 11,974.00 41,197.00 2,834.00 \$599.98 \$1,194.98 11,521.00 11,627.00 \$1,194.98 \$1,521.00 11,627.00
92506 19270 192619 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 19899 POW 94396 94396 94396 10551	LabelWriter XI. LabelWriter XI. Plus  Fison  Stylus Color Ink Jet Printer  PACKARD  HP DeskWriter 320  HP DeskWriter 540  HP DeskWriter 560C  HP LaserJet 44M  HP LaserJet 44M  HP LaserJet 44M  FY LaserJet 45 MW  Texas Instruments  MicroWriter PS23  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS85  Tipp Lite BC S00 UPS  Tripp Lite BC 500 UPS	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 \$498.98 \$1,014.00 \$1,974.00 \$4,197.00 \$599.98 \$1,1521.00 \$1,521.00 \$1,527.00 \$18.98 \$29.98 \$115.98 \$179.98 \$29.98 \$179.98
95506  19270  92619 92617 95522 21151 21155 21157 21159  06859 14319 14320 19399 14320 19396 94395 07150 06661 04744 MED	LabelWriter XI. LabelWriter XI. Plus  Fison  Stylus Color Ink Jet Printer  Fison  Stylus Color Ink Jet Printer  Fison  HP DeskWriter 320  HP DeskWriter 350  HP DeskWriter 500C  HP DeskWriter 500C  HP LaserJet 4MI  HP LaserJet 4MI  HP LaserJet 4MI  Microlaser Pro 600 PS23  MicroLaser Pro 600 PS25  APS Personal Surge Arrest WPhone  BackUps 200  BackUps 400  BackUps 400  BackUps 600  Tripp Lite BC 250 UPS  Tripp Lite BC 500 UPS  Firip Lite BC 500 UPS  Bernoulli Cortridges  Bernoulli Gothis Cart	\$226.98 \$506.00 \$309.98 \$226.98 \$226.98 \$1,101.00 \$1,107
92506 19270 192619 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 19899 POW 94396 94396 94396 10551	LabelWriter XI. LabelWriter XI. Plus  Fison  Stylus Color Ink Jet Printer.  FIDEL TYPE  HP DeskWriter 320  HP DeskWriter 540  HP DeskWriter 560C  HP LaserJet 4MI.  HP LaserJet 4MI Plus  HP LaserJet 4MI Plus  HP LaserJet 4MI Plus  HP LaserJet 4MI Plus  MicroWriter PS23  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS25  MicroLaser Pro 800 PS65  APC  APC  APS Personal Surge Arrest wPhone  BackUps 200  BackUps 400  BackUps 400  Tripp Lite BC 400 UPS  Tripp Lite BC 400 UPS  Tripp Lite BC 500 UPS  Bernoulli 105MB Cart  Bernoulli 105MB Cart  Bernoulli 105MB Cart	\$228.98 \$508.00 \$309.98 \$295.98 \$498.98 \$498.98 \$1,014.00 \$1,974.00 \$4,197.00 \$599.98 \$1,1521.00 \$1,521.00 \$1,527.00 \$18.98 \$29.98 \$115.98 \$179.98 \$29.98 \$179.98
92506 19270 92619 92617 9552 21151 21155 21157 21159 06859 143120 14320 14320 14320 14320 14395 07150 06661 04744 777ED 96824 97289 97291	LabelWriter XL LabelWriter XL Plus Epson Stylus Color Ink Jet Printer EPSON Stylus Color Ink Jet Printer EPSON HEWLETT PACKARD HP DeskWriter 500 HP DeskWriter 500 HP DeskWriter 500 HP Laserdet 4ML HP Laserdet 4ML HP Laserdet 4MS HP Laserdet 4MS MicroLaser Pro 600 PS23 MicroLaser Pro 600 PS23 MicroLaser Pro 600 PS25 MicroLaser Pro 600 PS65 M	\$226.98 \$508.00 \$309.98 \$2255.98 \$3285.98 \$3489.98 \$1,974.00 \$1,974.00 \$599.98 \$1,194.98 \$22.984.00 \$1,152
95506  19270  92619 92617 95522 21151 21155 21157 21159  06852 14329 14329 14329 14329 1750 1795	LabelWriter XI. LabelWriter XI. Plus  Fyson  Stylus Color Ink Jet Printer  PARKARD  HP DeskWriter 320  HP DeskWriter 540  HP DeskWriter 540  HP LaserJet 4MI.  HP LaserJet 4MI.  HP LaserJet 4MI.  For Stylus Color Ink Jet Printer  MicroWriter PS23  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS25  MicroLaser Pro 800 PS25  APC  APS Personal Surge Arrest APS Personal Surge Arrest wPhone BackUps 200  BackUps 400  BackUps 500  BackUps 400  BackUps 500  BackUps 400  BackUps 500  BackUps 500  BackUps 400  BackUps 400  BackUps 500  BackUps 600  Fripp Lite Bc 250 UPS  Tripp Lite Bc 600 UPS  Journal In SUMB Cart  Bernoulli 150MB Cart	\$228.98 \$508.00 \$309.98 \$489.98 \$489.98 \$489.98 \$49
92506 19270 92619 92617 9552 21151 21155 21157 21159 06859 143120 14320 14320 14320 14320 14395 07150 06661 04744 777ED 96824 97289 97291	LabelWriter XI.  LabelWriter XI. Plus  FSON  Stylus Color Ink Jet Printer  FDON  Stylus Color Ink Jet Printer  FDON  HEWLETT  HP DeskWriter 320  HP DeskWriter 340  HP Laseriet 4MI  HP Laseriet 4MI  HP Laseriet 4MI  FUNCE Instruments  MicroWriter PS23  MicroLaser Pro 800 PS23  MicroLaser Pro 800 PS25  MicroLaser Pro 800 PS25  MicroLaser Pro 800 PS85  MicroLaser Power Pro  APC  APS Personal Surge Arrest w/Phone  BackUps 260  BackUps 400  BackUps 600  Tripp Lite BC 250 UPS  Tripp Lite BC 400 UPS  MicroLaser Power Robert MicroLaser Robert Rober	\$226.98 \$508.00 \$309.98 \$2255.98 \$3285.98 \$3489.98 \$1,974.00 \$1,974.00 \$599.98 \$1,194.98 \$22.984.00 \$1,152
95506 19270 92619 92617 9552 21151 21155 21157 21159 06859 143120 14320 14320 14320 14320 14320 14320 14320 14320 14320 96851 04744 777ED 06861 04744 777ED 02183 00183 99922 00278 99929	LabelWriter XI.  LabelWriter XI. Plus  Fison  Stylus Color Ink Jet Printer.  Fison  Stylus Color Ink Jet Printer.  Fison  Stylus Color Ink Jet Printer.  Fison  HP DeskWriter 320  HP DeskWriter 320  HP DeskWriter 320  HP Laserdet 4MI.  HP Laserdet 4MI.  HP Laserdet 4MI.  HP Laserdet 4MI.  Fison  Fison  Fison  Fison  Microlaser Pro 600 PS23  Microlaser Pro 600 PS25  Microlaser Pro 600 PS25  Microlaser Pro 600 PS25  APS Personal Surge Arrest w/Phone  BackUps 250  BackUps 250  BackUps 250  BackUps 250  BackUps 400  BackUps 250  BackUps 600  Tripp Lite  Tripp Lite BC 250 UPS  Tripp Lite BC 500 UPS  Tripp Lite BC 500 UPS  APS Personal Surge Arrest w/Phone  BackUps 400  BackUps 600  Filipp Lite BC 250 UPS  Tripp Lite BC 500 UPS  APS Personal Surge Arrest w/Phone  BackUps 400  BackUps 400  BackUps 400  BackUps 400  SackUps 400  SackUps 400  BackUps 400  BackU	\$226.98 \$508.00 \$309.98 \$226.98 \$489.98 \$489.98 \$1,074.00 \$59.98 \$1,194.90 \$22.854.00 \$1,152.00 \$1,152.00 \$1,152.00 \$25.98 \$29.9
95506 19270 92619 92617 9552 21151 21155 21157 21159 06859 143120 14320 14320 14320 14320 14320 14320 14320 14320 14320 96851 04744 777ED 06861 04744 777ED 02183 00183 99922 00278 99929	LabelWriter XL. LabelWriter XL. Plus  Fison  Stylus Color Ink Jet Printer.  FISON  Stylus Color Ink Jet Printer.  FISON  Stylus Color Ink Jet Printer.  FISON  HEWLETT  PACKARD  HP DeskWriter 540  HP DeskWriter 540  HP DeskWriter 560C  HP Laserdet 4MI.  HP Laserdet 4MI.  HP Laserdet 4MI.  Microlarer Pro 800 PS23  Microlaser Pro 800 PS23  Microlaser Pro 800 PS23  Microlaser Pro 800 PS85  APC  APC  APS Personal Surge Arrest wPhone  BackUps 200  BackUps 400  BackUps 400  BackUps 400  Tripp Lite BC 400 UPS  Tripp Lite BC 500 UPS  Tripp Lite BC 400 UPS  Tripp Lite BC 500 UPS  Tripp Lite BC 400 UPS  Tripp Lite BC 500 UPS	\$226.98 \$508.00 \$309.98 \$489.98 \$489.98 \$1,014.00 \$1,014.00 \$1,014.00 \$599.98 \$1,194.98 \$29.98 \$29.98 \$115.98 \$29.98 \$315.98 \$315.98 \$315.98 \$315.98 \$315.98 \$315.98 \$315.98 \$315.98 \$315.98 \$315.98 \$315.98
92619 92617 92619 92617 95522 211551 21155 21157 21159 06859 14329 14329 14329 17950 07150	LabelWriter XI. LabelWriter XI. Plus  FSOR  Stylus Color Ink Jet Printer  FD BESKURTER SOR  HP DESKWriter SOR  HP DESKWriter SOR  HP DESKWriter SOR  HP Laseried 4MI  HP Laseried 4MI  FU Laserie	\$228.98 \$508.00 \$309.98 \$489.98 \$489.98 \$489.98 \$49.98 \$49.98 \$49.98 \$49.98 \$49.98 \$49.98 \$579.98 \$579.98 \$49.98 \$579.98 \$49.98 \$579.98 \$49.98 \$579.98
95506 19270 92619 92617 9552 21151 21155 21157 21159 06859 143120 14320 14320 14320 14320 14320 14320 14320 14320 14320 96851 04744 777ED 06861 04744 777ED 02183 00183 99922 00278 99929	LabelWriter XL LabelWriter XL Plus  FSON  Stylus Color Ink Jet Printer  PARKARD  HP DeskWriter 320 HP DeskWriter 540 HP DeskWriter 540 HP DeskWriter 540 HP LaserJet 4ML HP LaserJet 4ML HP LaserJet 4ML HP LaserJet 4MN  Toxas Instruments  MicroWriter PS23 MicroLaser Pro 800 PS23 MicroLaser Pro 800 PS25 MicroLaser Pro 800 PS65 MicroLaser Power Pro  APC  APS Personal Surge Arrest wPhone BackUps 250 BackUps 400 Back	\$226.98 \$508.00 \$309.98 \$489.98 \$489.98 \$1,144.00 \$599.98 \$1,194.98 \$29.98 \$1,154.98 \$29.98 \$115.98 \$1
95506  19270  92619 92617 9552 21151 21155 21157 21159  06859 143120 143	LabelWriter XI. LabelWriter XI. Plus  Fison  Stylus Color Ink Jet Printer  FISON  Stylus Color Ink Jet Printer  FISON  Stylus Color Ink Jet Printer  FISON  HEWLETT  PACKARD  HP DeskWriter 320  HP DeskWriter 320  HP DeskWriter 500C  HP Laserlet 4MI  FI Laserlet 4MI  FI Laserlet 4MI  FI Laserlet 4MI  FI Laserlet 4MI  FISON	\$226.98 \$508.00 \$309.98 \$2259.58 \$489.58 \$489.58 \$1,04.00 \$1,197.00 \$599.98 \$1,197.00 \$1,197.00 \$29.98 \$115.98 \$29.98 \$115.98 \$29.98 \$29.98 \$315.98 \$3
92619 92617 92619 92617 92617 9552 21151 21155 21157 21159 06859 14319 14320 13899 POW 94396 94396 94396 104744 WED 96824 97289 97281 02183 00183 99822 00278 97996 10474 97289 97996 10474 97289	LabelWriter XI. LabelWriter XI. Plus  Fison  Stylus Color Ink Jet Printer  Packard  HP DeskWriter 320 HP DeskWriter 540 HP DeskWriter 540 HP DeskWriter 540 HP LaserJet 44M HP LaserJet 44M HP LaserJet 44M HP LaserJet 44M HP LaserJet 45H MICROWRITER 523 MICROLaser Pro 600 PS23 MICROLaser Pro 600 PS23 MICROLaser Pro 600 PS25 MICROLASER POWER PRO 600 MICROLASER PRO 600 MICROLA	\$226.98 \$508.00 \$309.98 \$309.98 \$409.98 \$1,974.00 \$1,974.00 \$1,974.00 \$1,974.00 \$599.98 \$1,194.98 \$22.98 \$115.98 \$22.98 \$115.98 \$22.98 \$115.98 \$22.98 \$115.98 \$23.98 \$115.98 \$23.98 \$115.98 \$1
95506 19270 92619 92617 95522 21151 21155 21157 21159 06859 14319 914320 14320	LabelWriter XI. LabelWriter XI. Plus  Fison  Stylus Color Ink Jet Printer  Packard  HP DeskWriter 320 HP DeskWriter 540 HP DeskWriter 540 HP DeskWriter 540 HP LaserJet 44M HP LaserJet 44M HP LaserJet 44M HP LaserJet 44M HP LaserJet 45H MICROWRITER 523 MICROLaser Pro 600 PS23 MICROLaser Pro 600 PS23 MICROLaser Pro 600 PS25 MICROLASER POWER PRO 600 MICROLASER PRO 600 MICROLA	\$226.98 \$508.00 \$309.98 \$229.98 \$489.98 \$489.98 \$489.98 \$489.98 \$489.98 \$489.98 \$499.98 \$22.834.00 \$599.98 \$115.92 \$11
95506 19270 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320	LabelWriter XI. LabelWriter XI. Plus  FSON  Stylus Color Ink Jet Printer  FDON  Stylus Color Ink Jet Printer  FDON  HEWLETT  HP DeskWriter 320  HP DeskWriter 320  HP DeskWriter 540  HP Lasevider 4MP Jet 1998  FER STAND  FER STAND  FER STAND  FER STAND  FOR STAND	\$228.98 \$508.00 \$309.98 \$229.98 \$489.89 \$489.89 \$489.98 \$489.98 \$115.97.40 \$519.99 \$11.99.49 \$11.521.00 \$11.52
92619 92619 92617 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 13939 POW 94396 94396 94396 94396 94396 94396 94397 94396	LabelWriter XL LabelWriter XL Plus  Epson  Stylus Color Ink Jet Printer  LabelWriter SD  HEWLETT  PACKARD  HP DeskWriter 540 HP DeskWriter 540 HP DeskWriter 560C HP LaserJet 4ML HP LaserJet 4ML HP LaserJet 4MV  Texas Instruments  MicroWriter PS23 MicroLaser Pro 800 PS23 MicroLaser Pro 800 PS25  MicroLaser Pro 800 PS25  APC  APC  APS Personal Surge Arrest wPhone BackUps 200 BackUps 400  BackUps 400 B	\$226.98 \$508.00 \$309.98 \$309.98 \$409.98 \$1,974.00 \$1,974.00 \$1,974.00 \$1,174.00 \$1,174.00 \$1,174.00 \$22.98 \$1,194.98 \$22.98 \$115.98 \$22.98 \$115.98 \$22.98 \$115.98 \$22.98 \$115.98 \$23.98 \$115.9
92619 92619 92617 92619 92617 95522 21151 21155 21157 21159 06859 14319 14320 13939 POW 94396 94396 94396 94396 94396 94396 94397 94396	LabelWriter XI. LabelWriter XI. Plus  FSON  Stylus Color Ink Jet Printer  FDON  Stylus Color Ink Jet Printer  FDON  HEWLETT  HP DeskWriter 320  HP DeskWriter 320  HP DeskWriter 540  HP Lasevider 4MP Jet 1998  FER STAND  FER STAND  FER STAND  FER STAND  FOR STAND	\$228.98 \$508.00 \$309.98 \$229.98 \$489.89 \$489.89 \$489.98 \$489.98 \$115.97.40 \$519.99 \$11.99.49 \$11.521.00 \$11.52

### PLI Infinity 270 Turbo S

 13.5ms access speed
 2.2MB/second sustained data transfer rate This reliable, high performance

270MB removable cartridge drive retrieves your data fast its average access speed is just 13.5ms! This drive can also



105 Turbo S cartridges. PLI #96823

### Cellular/Data Link for Motorola MicroTac Flip

Includes everything you need for instant use
Backed by a three-year warranty

The Cellular/Data Link is an intelligent interface that allows you to directly connect any

modem-equipped computer or fax machine to a portable cellular telephone by simply replacing the phone-specific adaptor cable. ORA #94367



\$197

### Micro AsantéPrint 10T

Micro AsantéPrint™ allows you to connect up to eight LocalTalk printers to an Ethernet network. At work for you right out of the box.

Micro AsantéPrint automatically senses the type of Ethernet cable being connected and auto-selects between the AppleTalk Phase 1 and 2 protocols, reducing set up time to a matter of seconds. Includes AsantéPrint Manager™ and Advanced Network Security Protocol™ for extra management and security. Asanté #93330



15815 S.E. 37th Street, Bellevue, WA 98006-1800

Please mention this source BW 504 code when ordering:

Sales Advisors hel make buying easy!

# ProDirect 800-524-9952 ProDirect 800-524-9952

### **Hard Drives**

# Quantum Quantum Quantui



(2 Maverick Series

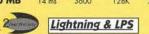
Quantum hard drives are based on customer focused innovation, making Quantum a leading manufacturer of 2.5 inch and 3.5 inch high quality

high performance

hard disk

drives.

Capacity	Access	RPM	Cache	Int.	Ext.
270 MB	14 ms	3600	128K	170	230
540 MB	14 ms	3600	128K	245	305



Capacity	Access	RPM	Cache	Int.	Ext.
170 MB	11 ms	4500	128K	\$165	\$225
270 MB	11 ms	4500	128K	185	265
365 MB	11 ms	4500	128K	195	255
540 MB	9.5 ms	4500	512K	245	305
730 MB	11 ms	4500	128K	285	345



10ms	5400	512K	585	645
9.5 ms	5400	512K	695	645 755
9.5 ms	5400	512K	1005	1065
8.6 ms	7200	512K	2175	2235
	<b>9.5 ms</b> 9.5 ms	<b>9.5 ms 5400</b> 9.5 ms 5400	<b>9.5 ms 5400 512K</b> 9.5 ms 5400 512K	9.5 ms         5400         512K         695           9.5 ms         5400         512K         1005

### Daytona Powerbook Drives

Capacity	Access	Warranty	Int.	Ext.
256 MB	17ms	1 Year	280	380
514 MB	14ms	1 Year	465	565

# MICROPΩLIS MICROPΩLIS ©

Capacity	Size	Model	Access	RPM	Cache	Int.	Ext.
1.2 GB	3.5"	M4110 Low	8 ms	5400	512K	\$585	\$645
1.7 GB	3.5"	M2217	10 ms	5400	512K	895	955
2.1 GB	3.5"	M4221 low	8.5 ms	7200	512K	1075	1135
3.6 GB	5.25"	M1936	11 ms	5400	256K	1220	1320
4.3 GB	3.5"	M3243	8.5 ms	7200	512K	2015	2075
9.0 GB	5.25"	M1991	11 ms	5400	512K	3345	3445

Capacity	Size	Model	Access	RPM	Cache	Int	Ext
1.2 GB	3.5"	ST31200N	10ms	5400	512K	\$575	\$635
4.2 GB	3.5"	Hawk 4	9ms	5400	512K	2010	2070
1.9 GB	3.5"	Barracuda	1 8ms	7200	1024K	1035	1095
2.4 GB	3.5"	Barracuda 2	8ms	7200	1024K	1175	1235
4.2 GB	3.5"	Barracuda 4	8ms	7200	1024K	2175	2235
9 GB	5.25"	ST 410800N	11ms	5400	512K	Call	Cal

IBM Drives utilize IBM''s advanced Magneto-Resistive	IBM	IBM	IB	M IBM	IBI
(MR) disk technology technology which increases the amount	Capacity	Seek	RPM	Warranty	Int.
of data stored per	540 MB	12 ms	4500	2 Year	265
disk surface and reduces the number of	720 MB	12 ms	4500	2 Year	360
heads making the	1.0 GB	11 ms	5400	5 Year	595
IBM series more slim- lined and reliable.	2.0 GB	9 ms	5400	5 Year	1060

	Capacity	Seek	RPM	Warranty	Int.	Ext
"	540 MB	12 ms	4500	2 Year	265	325
of	720 MB	12 ms	4500	2 Year	360	420
	1.0 GB	11 ms	5400	5 Year	595	655
n-	2.0 GB	9 ms	5400	Warranty 2 Year 2 Year 5 Year 5 Year	1060	1130
_	_					

### Genuine Products by

	SYC	24	<b>e</b> s
Capacity	Seek	RPM	Int.
88 MB sqs110C	20ms	3200	300
200 MB 5G5200	18 ms	3200	420
270 MB 503270	13.5ms	3200	420

2 Year Warranty on all SyQuest Drives SyQuest drives come complete with a cartridge (Formatte Unformatted) and the latest SCSI 4.3 compatible softwa

### SyQuest Medic

Capacity	Model	Warranty	P
44 MB	SQ400	5 year	\$
88 MB	SQ800	5 year	
105 MB	SQ310	5 year	Į.
200 MB	SQ2000	5 year	8
270 MB	SQ327	5 year	

Cartridge Include SyQuest Drives!

5 Year Warranty (A)	HEWLET PACKAR	5 6	HEWL
Capacity	Access	RPM	Int.
1.2 GB C332	3 9.5 ms	5400	\$625
2.4 GB C249	0 8.5 ms	6400	1150

# Direct to Disk Recording Audio/Visual Hard Drives

### MICROPΩLIS MICROPΩLIS Access RPM Model Cache Capacity Size Int. 1.2 GB 3.5" M4110AV 10 ms 5400 512K \$625 \$685 1.7 GB 3.5" 945 M2217AV 10 ms 5400 1005 512K 8.5 ms 7200 2.1 GB 3.5" M4221AV 512K 1120 1170 3.6 GB 5.25" M1936AV 11 ms 5400 512K 1265 1365 4.3 GB 9.0 GB 3.5" M3243AV 8.5 ms 7200 512K 2075 2135 5.25" M1991AV 11 ms 5400 512K 3395 3495

Always call for the Most Competitive Pricing!!!!

Questions? Call our expert AV sales staff

ProDirect A/V Hard Drives are specially tuned for Maximum A/V Performance!!!

Call to determine what AV drive will meet your specific needs.



20	Capacity	Size	Model	Access	RPM	Cache	Int	E
ati	1.9 GB	3.5"	Barracuda 1	8ms	7200	1024K	1035	10
mir	2.4 GB	3.5"	Barracuda 2	8ms	7200	1024K	1175	123
Ter	4.2 GB	3.5"	Barracuda 1 Barracuda 2 Barracuda 4	8ms	7200	1024K	2175	223
ive			Barracuda 2W				1345	
Act	4.2 GB	3.5"	Barracuda 4W	8ms	7200	1024K	2485	261



# Quantum Quantum Quantum Quantum Quantum



The new A/V drives by Quantum with MR technology are specially tuned to maximize your performance by ProDirect

	Capacity	Size		
	1.0 GB	3.5"		
	2.1 GB 4.3 GB	3.5"		
:!!	4.3 GB	3.5"		

00 1024K Call	Call
1004K 110F 1	
00 1024K 1195 1	255
00 2048K Call	Call
K	2048K Call



Maximizing your Transfer Rate and no thermal recalibration (T-Cal) equals

> Maximum A/VPerformance!!!

### CD Rom Drives

NEC	Access	Transfer	Price
MultiSpin 2V	320ms	300Kb/sec	\$245
MultiSpin 3Xp	240ms	500Kb/sec	\$395
MultiSpin 4Xe	220ms	600Kb/sec	\$495
Plextor			
4PlexQuadSpeed	235ms	600Kb/sec	\$540
CHINO	N		

CDX535Dual Speed 280ms 300Kb/sec \$235

# Scanners & Printers

Transparency Adapter	\$1220 \$535 \$1450
----------------------	---------------------------

UMAX	UC630/1 Vista-Se Powerld			675/1240 760 3250
and the second	VINCE/SHIP WOR	NP 3374 (1967)	Tunkele-skip	t Vicentia

T OTTOTTOON	OLUU
DeskWriter 560C InkJet Printer DeskWriter 1200C LaserJet 4ML Printer LaserJet 4MP Printer LaserJet 4M Plus Printer	r \$568 1995
LaserJet 4ML Printer	1027
LaserJet 4MP Printer	1367
LaserJet 4M Plus Printer	2120

# Tape Backup Drives

ProDirect always suggests that our customers back up their hard drives. In the event of hard drive failure, be assured and back up your data with quality tape backup drives by Hewlett		PACKA	PD W	HEWLETT (6)	HEWLETT PACKARD	(D) H	EWLETT
		Capacity	Model	Transfer Rate	Media	Int.	Ext.
		2.0 GB	35470	15 MB/min	4mm	\$835	\$885
		3-5 GB	35480	45 MB/min.	4mm	1039	1099
	& Exabyte	4-10 GB	1533A	60 MB/min.	4mm	1235	1295
my	DeskTape	20-50 GB	1553A Auto Tape L	60 MB/min.	4mm	3195	3295
NEW!!!	Allows you to mount your	Exabyt	е				
TAME	DAT on theDesktop!	2-5 GB	8205	263 KB/sec.	8mm	\$1425	

20-30 01	I JOSA	OU MB/ min.	4000	3173	3273
	Auto Tripe Lo	ader			
Exaby	te				
2-5 GB	8205	263 KB/sec.	8mm	\$1425	\$1495
5-10 GB	8505	500 KB/sec.	8mm	2175	2275
7-14 GB	8505XL	500 KB/sec.	8mm	2250	2310

All tape backup drives include 1 piece of media and Retrospect backup software.

### SCSI-2 Accelerator: PLI Power PC Compatible

Quick SCSI F Nubus Card Great for desktop publishing. Silicon Express Fast SCSI-2 Call 2 support, transfer ruses multiple block sizes, takes advanta tuliau Ideal for graphic design

### Hard Drive Cabinet Zero Footprint MicroCab \$75 \$89 Full Height Multi Bay Cabinets

### Memory Products **Powerbook Memory**

ı	Memory
	2x8x80
l	4x8x80 60/70ns
ı	4x8x80 FX
ı	16x8x80 Low Profile

16x8x80 FX

Call for

and

pricing!!!

Backing up your data is

as easy as drag and drop!!

Centris, LCIII, Quadra 4MB 60/70ns 8MB 60/70ns 16MB 70ns 32MB 60ns

VRAM 256K/512K

520.520c.540.540c 4MB,8MB,16MB,32MB 140,170,160,165c,180,180c,Duos 4MB.6MB.8MB.10MB 12MB,14MB,20MB

Lifetime warranty on all memory products!!!

Call for the most competitive pricing on Memory!!!



- Your Choice of a double shielded 25/50 PIN SYSTEM CABLE OR A 50/50 PIN DAISY CHAIN CABLE WITH THE PURCHASE OF ANY EXTERNAL DRIVE
- 30 DAY MONEY BACK GUARANTEE
   SAME DAY SHIPPING ON MOST PRODUCTS ADVERTISED!
- KNOWLEDGEABLE SALES STAFF AND TECHNICAL SUPPORT STAFF

Fax 24 hours a day 612-941-110 International orders call 612-941-1805 In Minnesota call 612-941-1805

All prices are subject to change without notice. Refused orders are subject to a restocking fee. International customers pay all shipping charges. All shipping charges are non-refundable. To return merchandise call for an RMA number. All RMAs must be returned within 10 business days of issuance. All returns without an RMA number will not be accepted.



**Business Hours** 8:00am-7:00pm (CST) Mon.-Fri.

ProDirect, Inc. 6824 Washington Ave. South Eden Prairie, MN 55344



# 800-572-4305

# 30 DAY MONEY-BACK

INT'L:612-937-9604 FAX:612-937-6285 HOURS: M-F 8:00-6PM CST









### HARD DRIVES

The First 2gig Drive under \$1000. THE CONNOR 2.1gig

# YEAR WARRANTY

APACITY	SIZE	ACCESS	INI	ERNAL	EXI	ERNAL
30MB**	3.5"	13MS	\$	279	\$	339
2G1G	3.5"	8.5MS	\$	575	\$	635
Sea Sea	gate	<b>5</b> Y	EAR	WAR	RAI	NTY
I D. I. O. LOUI	O. T. T.		*****		PERM	-

EXTERNAL
\$ 645
LP \$ 1295
WIDE \$ 1499
Dual Head \$ 1749
\$ 1999
4 \$ 2335
\$ 3549
I

### YEAR WARRANTY CONNER

APACITY	SIZE	ACCESS	MODEL	EX	TERNAL
45MB**	3.5"	12MS	CFA540S	\$	364
.OGIG	3.5"	9MS	CFP1060S	\$	635
.1GIG	3.5"	9MS	CFP2105S	\$	995
.1GIG	3.5"	8MS	CFP2107S	\$	1245
.2GIG	3.5"	9MS	CFP4207S	\$	1995
Quant	um		VEAD WAE	DA	NTV

Ruant	um		ILAN WAI	MMMII
APACITY	SIZE	ACCESS	MODEL	EXTERNAL
.OGIG	3.5"	9MS	E1080S	\$ 645
.2GIG	3.5"	9.5MS	E2160S	\$ 1099
3616	3 5"	2MP	42805	\$ 2095

40MB	14MS	\$315	\$415			
40MB	14MS	\$385	\$485			
14MB	14MS	\$445	\$545			



### CD ROMS

TEAC CD-50		\$	275
Toshiba 4101		\$	285
Toshiba 3501	4 Speed	\$	445
Yamaha 4 spe	ed recorder	\$	4495
Three multimode r		disc-	-at-once,

track-at-once and multisessions. This 5 1/4" halfheight will meet your most demanding needs. Ricoh CD-Recorder \$ 1575

**Dual Speed** 1.2MB Buffer so you won't get data transfer interruptions. And 680MB media 10 pack for only \$ 99. Just set the recording format, select

### MONITORS

Sony GDM-15SF1 15" Flat anti-glare coated supports every PC and Mac resolution ie. 1280 x1024

### TRINITRON MONITORS

the files, and hit create

Intimitation montrollo					
Sony	CPD-17SF1	17"	\$889		
Sonv	GDM-20SE1	20"	\$1899		



# OPTICAL DRIVES 230 MB EXTERNAL \$799

# YEAR WARRANTY

CAPACITY	MODEL	ACCESS	EXTERNAL
128MB	Ricoh	30MS	\$ 549
230MB	Fujitsu	30MS	\$ 799
230MB	Olympus 2YR. WARRANT	Y 28MS 4200 RPM	\$ 799
1.3GB	NEC	32MS	\$ 1899
1.3GB	Sony	40MS	\$ 1999
1.3GB	Ricoh Turbo	19MS	\$ 2175



# TAPE BACK-UP DC DAT 2GIG External

# YEAR WARRANTY

CAPACITY	MODEL	MEDIA	INT	ERNAL	EX	FERNAL
250MB	Tandberg TDC 3660	DC6250	\$	445	\$	499
1.3-2GIG	DC DAT	4MM	\$	709	\$	769
1.3-4GIG	DC DOUBLE DAT	4MM	\$	839	\$	899
4.0-8GIG	Connor 4326 DDS-2	4MM	\$	1089	\$	1149
4.0GIG	Sony 5200 DDS-2	4MM	\$	939	\$	999
4.0-8GIG	Sony 5000 DDS-2	4MM	\$	969	\$	1029
1.3-10GIG	Exabyte 8505	8MM	\$	2179	\$	2259
7.0-14GIG	Exabyte 8505XL	8MM	\$	2255	\$	2355
10-20GIG	Quantum DLT (DIGITAL LINEA INCREDIBLE 2.5MB/SEC TRAMSFER		\$	3575	\$	3675



### RAID SYSTEMS

FROM 1 TO 84 GIG

"This Array is the one to beat." - Ken Grey Writer for WIRED, Computer User, Movie Maker, Computer Video, and Digital Video magazines.

• 2.0GIG RAID Level 0. Perfect	
for highspeed requirements.	

• This Array is the one to beat!! 4.0 GIG Barracuda 2 Wide RAID.

6.0 GIG Fast and Wide. Fastest RAID for Video Vision Users. 5399

2299

3799



### MEDIA

100			A STATE OF THE STA	
128MB	Optical	\$ 25	90M Tape	\$ 12
230MB	Optical	\$ 35	112M Tape	\$ 15
650GIG	Optical	\$ 79	120M Tape	\$ 20
1.3GIG	Optical	\$ 99	CD ROM 10 Pack	\$ 99

DIRECT CONNECTIONS 7668 Executive Drive Eden Prairie, MN 55344 \* 1 YR WARRANTY. \*\* 2 YR WARRANTY. Gov't, Corp., and Univ. P.O's accepted. 30 day money back does not apply towards monitors.

Over 1,900 products for your Mac! Overnight delivery only \$3.00!

# **FileGuard**

Complete Multi-user Security



Ask for item# UTI 0624

# **DiskGuard**

Hard Disk and Folder Security



Ask for item# UTI 0591

DiskGuard Remote (5-User) UTI 0592.....\$269.95

DiskGuard Remote (10-User) UTI 0593.....\$450

Publisher: ASD Software

The Ultimate Desktop Publishing Bundle!



This unbelievable bundle includes:

Corel Gallery on CD-ROM
 Corel Professional Photo Sampler

Softkey Photo Library

MediaClips Worldview
 Key ClipMaster Pro

Softkey ClipArt Library

get all this for only

Over 23.500 images and typefaces on CD-ROM!

Ask for item # BND 0483 Shipped in promotional packaging

# Design CAD 2D/3D

Full 2D drafting and 3D modeling

Publisher: American Small Business

Ask for item# CAD 0043



# TaskForce



**CLIP ART FOR MACINTOSH** Publisher

New Vision Technology

000 images

Ask for item# GRA 0978

### Treasure Pack Ten full-length CD-ROMs for one great low price!

- CD Fun House 9.0
- · Gallery of Dreams:
- Surreal Imagery · Font Pro Volume 1.
- · Photo ProtM Vol. 3: FotoBank
- SuperToons™ • QuickToons™ 1:
- Cartoon Classics
- Newsbytes™
   1994 Edition
- · Washington Times & Insight 1994 Edition



POWER USER

Ask for item# **EDU 0847** ONLY 095

> Publisher Wayzata

Replace boring icons with colorful, extraordinary alternatives. Huge icon library included!

\*\*\*

Ask for item# UTI 0596



Also available: ClickChange 2.5 UTI 0407 \$3995

Publisher: Dubl-Click Software

### Get BOTH and SAVE!



when you buy both!

Ask for item # FIN 0259 \*Quicken 5 regularly \$44.95, MacInTax 1040 Final regularly \$34.95. Rebate offers do not apply. Offer expires 4/30/95.

# **Bulk Mailer 4.1**

A complete mail list package!

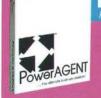
Ask for item# BUS 0362

**\$7095** 

Also available: **Bulk Mailer Plus** BUS0363 \$379.95 Publisher: Satori Software



### Automate manual tasks in ileMaker Pro with



# PowerAGENI

Ask for item# **UTI 0501** 

# Inspiration 4.

Create and organize ideas in both graphic and outline forms.

Ask for item# **BUS 0464** 



# t BLOWOU

Get a 44MB Removable SyQuest Drive for as low as 546 **44MB Power User** 

Removable SyQuest Drive (without cartridge) Ask for item #DRI 0977

### SyQuest Removable Cartridges as low as

WHILE

SUPPLIES

LAST!

Item #: Description Qty. 1-4 Qty. 5-9 Qty. 10+ MED 0035 \$59.95 \*\$49.95 44MB Removable Cartridge \$54.95 MED 0071 \$59.95 88MB Removable Cartridge \$64.95 \$54.95 MED 0146 200MB Removable Cartridge \$89.95 \$84.95



Order toll-free 24 hours a day, 7 days a week! 1-800-255-6227



# Adobe Photoshop 3.0



upgrade only

Includes 2 FREE CD-ROMs!

Adobe Photoshop 3.0

Photoshop 3.0

The FREE Photoshop CD includes: stock photography. Reader 1.0, and more!

The FREE Adobe Type on Call
CD includes: Adobe Type Reunion, over 2,000 encrypted fonts, Adobe ATM, and More!
Adobe Photoshop 3.0 Upgrade\*
UPG 0138

Adobe Photoshop 3.0 Upgrade\*

Adobe Photoshop 3.0 Full Version GRA 0916 \$559

Proof of ownership required. Call for details

### Photo Collection 01 Photos & Photoengravings-Royalty FREE



Ask for item# GRA 0893

100 photos, nature, trees 648 Mb EPS

Publisher:

# Now, get a new Power User

Ask for item# **BND 0507** 

TOSHIBA

Get the NEW! 1995 Grolier Multimedia **Encyclopedia on CD-ROM!** 

POWER USER Triple Speed Multi-session CD-ROM Drive Kit BND 0507.....\$199

The 1995 Groller Multimedia Encyclopedia plus The Animals! FREE BFE 0017.....

The 1995 Grolier Multimedia Encyclopedia with The Animals! and Atlas Pack FREE

\$7995\* **BBD 0162** with the purchase of a CD-ROM drive from Mac, Micro or CD-ROM Warehouse within the last 90 days prior to your purchase.

CD-ROMs!

2 BONUS 2. WORLD & US ATLAS PACK

With FREE

The Animals!

### ORDERING INFORMATION

To order, call toll-free

(1-800-ALL-MACS)

Call 24 hours a day, 7 days a week.

Compuserve Code: GOMW

**NEW! Express Customer Service Number:** 1-800-925-6227

MacWAREHOUSE

1720 Oak Street . PO. Box 3031 . Lakewood, NJ 08701 ©1995 Micro Warehouse Inc.

- All major credit cards accepted. No surcharge.

- All major credit cards accepted. No surcharge.

  Your credit card will not be charged until your order is shipped.

  If we ship a partial order, we pay the freight on the remaining portion.

  All U.S. shipments are insured at no extra charge.

  C.O.D. orders accepted (add \$6.00 including shipping)-\$1,000 maximum.

  All products are covered by a 120-day limited warranty. Defective software replaced
- immediately. Hardware replaced or repaired at our discretion.

   Some products may have system requirements. Call for details.

   Sales tax: CT residents add 6%, NJ residents add 7%, Ohio residents add applicable. tax
- All orders add \$3.00 per order. We ship Airborne Express overnight unless UPS Ground
- delivers overnight. (Some rural areas require an extra day.)

  orders placed by 12:00 MIDNIGHT (EST) (weekdays) for "in-stock" items ship same day (barring system failure, etc.) for overnight delivery.

  C.O.D. orders ship via UPS (Blue Label if you are more than 2 days from us via UPS
- Ground). Charge is \$6.00 including shipping.

  Alaska, Hawaii, outside continental U.S., APO/FPO call 908-367-0440 for information.
- Some products are not available outside the U.S.

  We regret that we cannot be responsible for typographical errors.

  For faster service for existing customers, our computers recognize incoming calls by the telephone number and instantly locate your records.

©Copyright 1995 MicroWarchouse, Inc. MacWAREHOUSE® is a distion of MicroWarchouse, Inc. MacWAREHOUSE® and MicroWarchouse, Inc. Item analibility and price subject to change without notice. Apple, the Apple logo, Mac and Macintosh are registered trademarks of Apple Computer, Inc.

Circle 150 on reader service card

### **2 FREE BONUSES!**



The Power User's Tool Kit ... a collection of powerful programs compiled exclusively for MacWAREHOUSE customers. Some of the programs are shareware, so you can try them free of charge some authors ask that you pay a small fee (\$8-\$25). Most programs, though, are absolutely FREE. The Power User's Tool Kit is FREE when you order from

MacWAREHOUSE. You pay only \$2.00 shipping and handling. Ask for Item # AAA 0107. All programs work with System 7, six are designed to add new features only to System 7.

**Full-Year Subscription**... to your choice of MacWAREHOUSE, MicroWAREHOUSE, Data Comm WAREHOUSE (networking products), or CD-ROM WAREHOUSE catalog. Just fill in and mail the

coupon below. We'll start your free subscription to the catalog with the next issue.

**FREE CATALOG SUBSCRIPTION** 

MW0495 Check the appropriate box(es) to receive your FREE 1-year subscription and mail this coupon to: 1720 Oak Street, P.O. Box 3031, Lakewood, NJ 08701

Name

Address Apt.

(Expect to receive your first issue within 4-6 weeks).

MARIZIBIOUSIZ

Microva REHOUS







# Great Products. Priceless Support!

# More Megs, less bucks!

**APS Q 730** 

### Get the APS Q 730 internal for only \$29995!

The APS Q 730 is an outstanding performer delivering all the exacting specifications of the APS Q 540, plus the added bonus of more Megs for your bucks! A great drive for any user.



**APS Q 270** 



### **APS Q 270**

With sustained transfer rates as high as 2.7MB and seek times as low as 10.8MB, the APS Q270 is the ideal addition to any Macintosh.

Internal SR2000

ARRAID from APS Technologies

is the high performance, easy-touse, Disk Array storage solution. ARRAID provides the power, reliability and plug-and-play simplicity Macintosh users expect.



U 00 0	Capa	city	RAID Stripe	Price
APS	AF	RR	AID	
ARRAID S2/5	5400 <sup>5</sup>	2GB	Striped	\$1599 <sup>95</sup>
ARRAID S4/5	400 <sup>5</sup>	4GB	Striped	289995
ARRAID S4/7	<b>7200</b> <sup>5</sup>	4GB	Striped	299995
ARRAID M1/	5400 <sup>5</sup>	1GB	Mirrored	159995



ARRAID: Disk Array systems from APS are high erformance, easy-to-us

Disk Array storage solutions. ARRAID provides the Power, Reliability and plug-and-play convenience Macintosh users expect. Available in mirrored or striped configurations up to 16GB, with a 5 year warranty

ARRAID is RAID Made Easy!

# ARD DRIV

For your Mac or Power Mac

Capacity 2040MB - 8673MB

Model	Capacity	Internal	SR2000
258N	1B - 2	006M	В
APS Q 270 <sup>2</sup> Quantum 270	258MB	\$15995	\$25995
APS Q 365 <sup>2</sup> Quantum 365 I	350MB	22995	32995
APS Q 540 <sup>2</sup> Quantum 540 l	516MB	24995	34995
APS Q 730 <sup>2</sup> Quantum 730 L	731MB	29995	39995
APS MS 411 Micropolis 4110	0 <sup>5</sup> 1002MB	59995	69995
APS ST 1.0 <sup>5</sup> Seagate ST 3123	1010MB	59995	69995
APS Q 1080 Quantum 10808	<sup>2</sup> 1029MB	59995	69995
APS Q 2.05 Quantum 2160 i	2006MB	109995	119995
APS MS 2.0 Micropolis 4221	1955MB	109995	119995

Macworld 1994 World-Class Awards:

Macworld 1993 World-Class Award: \* APS Hard Drive Series

Consultants Choice Award 1994:

\* Best Technical Support

MacUser Editor's Choice Award 1993;

\* Best New Storage Product

**Get Your Drive Today** 

from the Award Winner... **APS Technologies** 

★ Best Customer Service

\* Alternative Storage

\* Storage

	Combaction Control	STREET, SQUARE,	and allows	Andrew Co.
	APS MS 2.0AV Micropolis 4221AV	<sup>5</sup> 1955MB mechanism	\$119995	\$129995
	APS ST 2.0 <sup>5</sup> Seagate ST 32550N	2040MB Barracuda	129995	139995
	APS MS 4.05 Micropolis 3243 me	4075MB schanism	1999995	209995
	APS MS 4.0av <sup>5</sup> Micropolis 3243AV	4075MB mechanism	209995	219995
S	APS ST 4.0 <sup>5</sup> Seagate ST 15150 n	4294MB nechanism	219995	229995
	APS MS 9.0 <sup>5</sup> Micropolis 1991 me	8500MB chanism	339995	*3599 <sup>95</sup>
	APS MS 9.0av <sup>5</sup> Micropolis 1991AV	8500MB mechanism	349995	*3699 <sup>95</sup>
8	APS ST 9.0 <sup>5</sup> Seagate ST410800N	8673MB mechanism	349995	*3699 <sup>95</sup>

1-5 Denotes length of manufacturer's warranty

External Case is Special Full Height Only

Internal Price Listing
Full Height cases include SCSI Sentry FREE!
Internal drives for Quadra 800 and Centris 610 available

1428

DATerm™ patent pending Copyright © 1994 APS Technologie

APS Technologies 6131 Deramus, Kansas City, MO 64120

# **4** x CD for the 2x price!

**Order Now!** 24 Hours a day

**APS HyperDAT** 



For less than the cost of lot of companies' 2x drives, you get 4x performance (that's right, quad-speed). How fast is that? Try an average access time of 149 ms, and sustained transfer rates as high as 534KB/sec. Remember, you also get the best-engineered enclosure in the industry. Full metal shielding, stackability and APS' Digital Active Termination™ are a combination you can't find on comparable drives at any price.

Today with the APS 3501

**Quad-Speed CD ROM!** 

Join the Multimedia Revolution



### APS CD ROM DRIVES

Model	Price
APS T 3501 (in SR 2000) w/o Caddy	\$29995
APS CD ROM Caddy 3 Pack	\$19 <sup>95</sup>
APS CD ROM Caddy Single	<b>\$7</b> 95



### **APS INFOFAX**

APS stocks hundreds of CD titles; call our infofax today for a document directory at (800) 374-5802

All APS DATs Include Retrospect by Dantz



Macworld's 1994 World-Class **Award for Alternative** Storage goes to the APS line of DAT Drives

# APS REMOVABLE DRIVES

APS SQ 5110c	44/88MB <sup>†</sup>	\$36995
APS SQ 5200	200MB <sup>††</sup>	49995
APS SQ 3270	270MB	47995

† Does not format 44MB cartridges †† Does not format 44MB & 88MB cartridges All SyQuest Drives Include 1 FREE Cartridge

Contention of Alpha Hamburg Content	-01.004.71030	70.00	
SyQuest Media	1-4	5-9	10+
SQ-400 (44MB) cartridge	\$4495	\$4395	\$4195
IO-44 (44MB) cartridge**	4995	5395	5195
SQ-800 (88MB) cartridge	5495	7895	7795
IO-88 (88MB) cartridge**	6995	6895	6795
SQ-2000 (200MB) cartridge	8495	8395	895
SQ-310 (105MB) cartridge	5995	5895	5695
SO-327 (270MB) cartridge	6495	6395	6195

### Same day shipping for personal checks ( Restrictions apply )













Visa, Master Card, Discover, American Express: No Surcharge

# External configuration **APS DAT**

**APS DAT** 

The APS DAT is now an incredible deal! Now for a limited time, buy the APS DAT at just \$79995 and you'll get the expanded capability provided by an enhanced speed mechanism and hardware data compression! That's right! Just \$79995 buys the APS DAT- and now it's up to 20% faster than other DDS-1 DC drives. Pack up to 4GB\* of DATA on a 90M tape! -Amazing!

\*Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters

### APS MO DRIVES

Model

APS 230MB MO <sup>1</sup>	-	\$7	79995	
APS 1.3Gig MO <sup>1</sup>	1899 <sup>95</sup>	19	99995	
All MO Drives Include 1 F MO Media (unformatte 128MB cartridge — 230MB cartridge — 1.3Gig cartridge —		5-9 \$34 <sup>95</sup> 44 <sup>95</sup> 109 <sup>95</sup>	10+ \$2995 3995 10495 (1024KB/s)	

Internal

**SR 2000** 

### POWERBOOK DRIVES

Model	Capacity	Internal	LW Pro 630	Companion I
APS T 3401	324MB	\$34995	\$39995	\$49995
APS Q 341	320MB	34995	39995	_
APS Q 514	490MB	44995	49995	-
APS T 5201	500MB	44995	49995	59995

**APS INTERNATIONAL** Global Storage Resource APS Intl. Sales Line (816) 920-4109

On parle français au (816) 920-4135 Se habla español en (816) 920-4136 Si parla l'italiano in (816) 920-4137 Wir sprechen Deutsch (816) 920-4138 どうぞご遠慮なく日本語の ファックスでもお申込み下さい

24-Hour Intl. Fax: (816) 483-3077

# APS HyperDAT

If you need high-speed backup (not the kind that ties your server up and slows down your network), you need the DDS-2 power of the APS HyperDAT! Back up locally at rates as high as 28MB per minute! Pack up to 8GB\* on a single tape! Best of all, your regular DDS and DDS compression tapes can be read by APS HyperDAT, too!

\*Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters

### APS DAT DRIVES

	Model	Capacity*	Internal	SR 2000
LABS	APS DAT <sup>2</sup>	4G on 90m	\$74995	\$79995
\$\$\$1	APS HynerDAT	9C on 120m	94995	99995

\*Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.

DAT Media	1-4	5-19	20+
60-Meter	\$995	\$895	\$795
90-Meter	1195	1095	995
120-Meter (DDS-2)	2295	2195	2095

All APS DAT's Include Retrospect by Dantz

### POWERBOOK STUFF

APS SCSI DOC w/ PowerMerge Lite



Palm-Sized 25–30 PowerBook SCSI Adapter that includes a docking adapter for PowerBook and termination power indicator. Receive Power-Merge Lite Free with every APS SCSI DOC!



Days a Week 30-Day

MBG

Toll-Free Support

Awesome Warranties

**Factory** Direct Quality

Rapid Repair Return

24-Hour Product Sales



International



# **CRA Systems, Inc. 800/375-9000**

# TWO PAGES FOR THE COST OF ONE!

LOWEST PRICES ON NEW AND FACTORY CLEARANCE ITEMS

# TWENTY ONE INCH DISPLAYS

### Radius PrecisionColor Display 21 \$1499\*

- Microprocessor controls 1600x1200 to 1024x768
- · Flat screen · Razor sharp .28 dot pitch Ideal solution for professionals requiring maximum screen area, color accuracy, and razor sharp images.
  - \*With qualifying videocard, accelerator, or computer purchase

\$2899 SuperMac PressView 21 \$799 Radius 21 inch Grayscale Display RasterOps 21 inch Grayscale Display

# TWENTY INCH DISPLAYS

# 20 inches for the cost of 17!

While Supplies Last!-Your Choice of ...

### Radius PrecisionColor Display 20v \$999

- Multiple resolutions1280x1024 to 640x480
- · Mac/PC compatible
- · Works with most any Macintosh built-in video
- · "Best Overall Screen Uniformity" MacUser

### SuperMac or E-Machines 20

- 1152x870 to 1024x768
   Flat screen
- . Shadow Mask Tube . Built in video support \*With qualifying videocard, accelerator, or computer purchase

Radius 20 inch Gravscale Display

\$699

### \$1699 Radius IntelliColor Display 20e Limited Quantities!

- . Top rated 20" Trinitron, Best Money Can Buy
- . MacUser, MacWorld, and MacWeek Editor's Choice
- 1600x1200 to 640x400 Microprocessor Controls \*With qualifying videocard, accelerator, or computer purchase

# SuperView

Similar to Radius PowerView

Radius **PhotoBooster** 

Retail \$999

Features twin AT&T 3210

66MHz DSPs . Accelerates

MacUser Editor's Choice

**Deluxe Edition** 

Thunder DSP

Daughterboard

PhotoEngine \$CALL

PhotoShop

\$299

\$299

Radius

**PowerView** 

Allows most PowerBooks

displays and projectors.

SuperMac

and the Classic II to support

Photoshop Filters . Up to 10x faster than a Quadra 950

but also supports TV!

CRA Systems, Inc. full one year warranty. All quantities limited and sold on a first come first serve basis.

### SEVENTEEN INCH DISPLAYS

### SuperMac/E-Machines T16IIMR Limited Quantities!

- . High Grade Studio Trinitron Series
- . 25mm multi-resolution . Editors Choice
- Microprocessor Controls 1024x768 to 640x480

SuperMatch 17T Radius PrecisionColor Display 17 \$799

\$CALL

\*With qualifying videocard, accelerator, or computer purchase

## **PIVOT DISPLAY**

Radius Color Pivot LE

With purchase of video card.

We have cards for SE/30, LC. Ilsi, Nubus, and Quadras

\$599 **Precision Color Pivot** \$399 **Grayscale Pivot** Radius Full Page Display \$299

"With qualifying videocard, accelerator, or computer purchase

Apple Catalog Reseller Authorized Service Provider







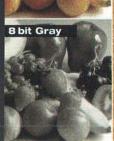
# 24 BIT **MILLIONS OF COLORS!**

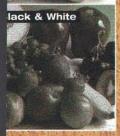
Buy 256 colors for \$199 and get 16 million free!

Finally a 24 bit video solution for the price of 8 bit. Upgrade to the industry standard with photorealistic color in applications such as Adobe Photoshop, Illustrator, PageMaker, and others. Even games, CDs, and most business applications such as Microsoft Word and Excel currently support millions of colors (24 bit). All cards available in limited quantities only. First come first serve.









21" RESOLUTIONS 24 BI		BIT
Total T	SuperMac Spectrum 24 Series V	\$599
	Radius PrecisionColor 24X	\$599
	Radius PrecisionColor Pro 24X	\$699
	All Thunder IV's	SCALL
	All Thunder II's	SCALL
	SuperMac Ultura LX with DSP Photoshop acceleration	\$1299
	RasterOps Horizon 24	\$1499
	RasterOps 24XLTV	\$1499
	RasterOps PaintBoard Pro	5799
	RasterOps PaintBoard Turbo XL	\$699
	RasterOps Prism GT	SCALL

ZI RESULUTIONS	
Radius PrecisionColor 8XJ	\$399
SuperMac DoubleColor LX	\$399
SuperMac Spectrum 8/24 PDQ	\$399

### 20/19" RESOLUTIONS 24 BIT 5499 Radius PrecisionColor 24XK \$599 Radius PrecisionColor Pro 24XK \$499 SuperMac Futura MX RasterOps PaintBoard Lightning \$499 RasterOps Prism 24 SCALL

20/19" RESOLUTIONS	8 BIT
SuperMac Spectrum & Series III	5 TOO

# 17/16" RESOLUTIONS 24 BIT

APPLE VIDEO CARDS

### Radius 24XP 199

Apple 8•24	<b>《多研》和</b> 數學》	\$399
Apple 8 Bit		\$99



Circle 20 on reader service card

# 68040 Accelerators **Radius Rockets**



\$399\*\* Radius Rocket 33MHz w/FPU \$499\*\* Radius Rocket 40MHz w/FPU \$899 Stage Two Rocket 40MHz w/FPU

-includes SCSI II Booster and RocketShare

5249 SCSI II Booster (up to 4x faster) \$299 **PhotoBooster for Rocket** \$299 RocketShare

\*\*With purchase of any Rocket peripheral

### **MULTI MEDIA**

# **Video Spigot Card from \$99**°

retail price \$599

**VideoVision Basic** SCALL SCALL **VideoVision Studio Upgrade VideoVision Studio** SCALL **VideoVision Studio Array** \$CALL

VideoSpigot Nubus \$99. Spigot and Sound \$299 199 VideoSpigot LC \$99 VideoSpigot Ilsi

\$399 VideoSpigot Pro \$149 MacRecorder **Adobe Premiere** 

\*\*With computer or video purchase \*With purchase of Premiere

Apple Catalog Reseller Authorized Service Provider

> Dealers and consultants call for quantity pricing. We ship anywhere.

Monday thru Friday 9AM to 8PM CST Saturday 10AM to 4PM CST Sales Department Only

> Domestic Sales 800.375.9000 Fax 817,754,2345

Consultants/Dealers 817,754,2131 International Sales 817,754,2120

Se hace pedidos internacional. Nous acceptons des commandes internationales. Internationale Handlerkonditionen.

Prices reflect cash discount. Not liable for typographical errors. All shipping charges for COD orders to be secured by credit card.

**CRA Systems, Inc.** 300 South 13th St., Waco, TX 76701

MACWORLD April 1995 207

# HEGITECH Drives... to Meet Your Storage Needs

HAK	ט ט	KIVES	ועו	1122	עו ני	ע נע
MICI	ROPC	DLIS"	The second	(	YEAR W	ARRANTY
Capacity	,	Model #	Seek	RPM	Internal	External
1.2 GB	(3.5")	DT-4110	8.5 MS	5400	\$585	\$645
2.0 GB	(3.5")	DT-2217	10 MS	5400	\$899	\$959
2.4 GB	(3.5")	DT-4221 LOW P	ROFILE 8 MS	7200	\$1099	\$1159
3.6 GB	(5.25")	DT-1936	11 MS	5400	\$1240	\$1340
4.0 GB	(3.5")	DT-3243	8.5 MS	7200	\$1799	\$1899
9.0 GB	(5.25")	DT-1991	11 MS	5400	\$3199	\$3299
MICRO	POLL	S AUDIO/VI	DEO SERI	ES		
Capacity		Model #	Seek	RPM	Internal	External
2.0 GB	(3.5")	DT-2217AV	10 MS	5400	\$945	\$1005
2.4 GB	(3.5")	DT-4221AVLOW		7200	\$1174	\$1234
3.6 GB	(5.25")	DT-1936AV	11 MS	5400	\$1290	\$1390
4.0 GB	(3.5")	DT-3243AV	8.5 MS	7200	\$1899	\$1999
9.0 GB	(5.25")	DT-1991AV	11 MS	5400	\$3299	\$3399
an -	(Account to	- L- more	THE RESIDENCE OF THE PARTY OF T	-		
9177	eaga	TE NEW	LOW PRICIN	G!!!	5 YEAR W	/ARRANTY
Capacity		Model #	Seek	RPM	Internal	External
1.2 GB	(3.5")	DT-31200	10 MS	5400	\$580	\$640
2.4 GB	(3.5")	DT-12400	9 MS	5400	\$1100	\$1160
2.4 GB	(3.5")	BARRACUDA	2 8 MS	7200	\$1160	\$1230
2.4 GB	(3.5")	BARRACUDA	2 WIDE 8 MS	7200	\$1350	\$1475
4.2 GB	(3.5")	BARRACUDA	4 8 MS	7200	\$2199	\$2299
4.2 GB	(3.5")	BARRACUDA	4 WIDE 8 MS	7200	\$2485	\$2615
3.5 GB	(5.25")	ELITE 3	10 MS	5400	\$1979	\$2079
9.0 GB	(5.25")	ELITE 9	11 MS	5400	\$3500	\$3600
11111	IEWLE			4	A YEAR W	/ARRANTY
The state of the s	ACKA	The state of the s				
Capacity		Model #	Seek	RPM	Internal	External
1.2 GB	(3.5")	DT-C3323	10 MS	5400	\$750	\$810
2.4 GB	(3.5")	DT-C2490	8.5 MS	6400	\$1199	\$1299
Quá	anti	um		· (	2) year w	/ARRANTY
Capacity	,	Model #	Seek	RPM	Internal	External
270 MB	(3.5")	LPS270	12 MS	4500	\$185	\$245
340 MB	(3.5")	LPS340	12 MS	3600	\$215	\$275
540 MB	(3.5")	LPS540	10 MS	4500	\$250	\$310
730 MB	(3.5")	LPS730	11 MS	4500	\$340	\$400
1.0 GB	(3.5")	EM1080	9.5 MS	5400	\$605	\$665
1.4 GB	(3.5")	EM1400	9.5 MS	5400	\$775	\$835
2.1 GB	(3.5")	EM2100	9.5 MS	5400	\$1045	\$1105
IBI	<b>F</b>	IBM (	QUALITY!	190	3 YEAR W	/ARRANTY
Capacity	;=	Model #	Seek	RPM	Internal	External
1.2 GB	(3.5")	IBM0662	8 MS	5400	\$620	\$680
2.35GB	(3.5")	IBM0664	9 MS	5400	\$1075	\$1175
4.0 GB	(3.5")	IBM34320	8 MS	7200	\$2200	\$2300
45	12.21	DIVIDIOLO	UIVIS	1200	42200	42200

1	E			
M		7	IJ)	
	1	_3		/
	6	3	2	اء
	E	=	7	0

### **SyQuest** REMOVABLE

Model #	Internal	External
SQ5110C	\$305	\$365
\$03105	\$245	\$305
SQ5200	\$425	\$485
SQ3270	\$425	\$485
	SQ5110C SQ3105 SQ5200	\$Q5110C \$305 \$Q3105 \$245 \$Q5200 \$425

MEDIA	New	Low PRICING!	
44 MB	\$42 \$48	105 MB	\$54
88 MB	548	200 MB 270 MB	\$54 \$76 \$64

### CD ROM DRIVES

Make	Model #	Seek	External
Toshiba CD ROM	DT4101	320MS	\$275
Toshiba CD ROM Toshiba CD ROM	DT-3401E DT-3501E	200MS 200MS	\$395 \$515

MAKE YOUR OWN CD!!!
IVC Personal Archiver

\$2800

L

END

### TAPE BACKUP Capacity Model # **Format** External \$1080 \$1199 \$1375 \$1499 4.0GB SONY 5200 DDS-2 DDS-2 SONY 5000 HP 1533A 4-8GB DDS-2 8MM 4-8GB 2-5GB **EXABYTE 8205** 5-10GB **EXABYTE 8505** 8MM \$2275

### **OPTICAL**

Capacity	Model #	Seek	External
230MB	FWITSU DYNAMO	30MS	\$950
1.3GB	HP C1716	23MS	\$2299
1.3GB	MAXOPTIX TAHITI III	18MS	\$2399
MEDIA			
1 GB	\$105	28 MB	\$30
1.3 GB	\$ 89	30 MB	\$50

### DICK ADDAYS

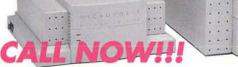
	Model # Se		Trans. Rate	Price
2.0GB	DT-31200AR	5MS	7MB per sec.	\$CALL
4.0GB	DT-32550AR	4.5MS	8MB per sec.	\$CALL
Disk Arrays	Include Trillium	Research.	Software, SCSI-Acc	elerator
Depart hand	come committee	ne makement	all we short street each	

INTRODUCING ... The Stackable,

All Drives are preformatted, tested and packaged with SCSI Manager 4.3 compatible drivers.

MICRODISK® AV LT & LS from MICROPOLIS

Removable, Gigabyte Drive Subsystem CALL for Information and Prices



SOFTWARE Connect your Mac to the Internet/Unix with Intercon Software. Call for lowest prices.



7615 Golden Triangle Drive-Suite M Eden Prairie, MN 55344 Int'l Orders (612) 941-2616 • Fax: (612) 942-0430





せたら

ITER SPECIALS\*\*\*\*

MICROPOLIS 4.0 GB CAPACITY • 8.5 MS SEEK • 7200 RPM • FAST SCSI-2 5 YEAR WARRANTY
 INTERNAL CONFIGURATION

SEAGATE BARRACUDA 2 LP

• 8 MS SEEK • 7200 RPM • FAST-SCSI-2 • 1024 CACHE

5 YEAR WARRANTY • INTERNAL CONFIGURATION

No charge for Visa or Mastercard! Gov't., Corp., University., P.O.'s welcome. RMA# required for all returns. Prices, Terms and Availability subject to change without notification.

# Save Your Work (And Your Money) On Spin Cartridges!



# Introducing the tough, inexpensive SyQuest™ compatible cartridge from Spin.

Now there is a new, less expensive choice in removable media. Constructed of the strongest, most advanced materials available, Spin cartridges deliver unsurpassed reliability. Manufactured under license from SyQuest Technologies, each cartridge is completely compatible with your 44MB,

"All the cartridges are equally tough... When deciding among cartridges based on different technologies, examine your budget.'

- MacUser July, 1994

88MB, and 200MB 5.25" removable drives. To further insure your satisfaction, we offer the protection of a 30-day money back guarantee, an unconditional 6-year warranty, and toll-free technical support. Both the 44MB and 88MB cartridges are in stock and ready to ship overnight.











BERNOULLI

OPTICAL SYQUEST

\$500 OVERNIGHT SHIPPING > FOR ANY ORDER UP TO 5 POUNDS!

Spin will ship any order to you overnight for just \$1.00 per pound, with a \$5.00 minimum. If your order is over 21 pounds your price per pound goes down.

**Toll Free Tech Support 30-Day Money Back Guarantee** FAX: 1-617-630-1201 1-617-630-1200



### SPIN CARTRIDGES OFFER YOU:

- ✓ Unsurpassed Reliability
- ✓ Full 6-Year Warranty
- ✓ Immediate Availability
- ✓ Overnight Delivery



381 Elliot Street, Newton Upper Falls, MA 02164

# ORDER DIRECT: 1-800-215-920





# Welcome to Spin Peripherals.

Spin supplies the best drives available so your business moves faster than the world around you. We deliver the speed and dependability you need, and our exceptional customer service team will be there when it seems the world is about to catch up. But don't worry, it won't.



### **DAT Drives**

Before disaster strikes, secure your valuable data with a Spin DAT drive. The low cost 3100 stores 2GB while the 3400 packs up to 8GB for remote backups and large audio, video and graphics files. All DAT drives include one tape cartridge and Retrospect™ for easy, complete backups.

Spin 3100 (DDS)	\$799
Spin 3200 (DDS-DC)	\$979
Spin 3400 (DDS-2)	\$999



### **Spin CD-ROM Drives**

Spin's 2x and 4x Multisession CD-ROM drives deliver the excitement of multimedia to your desktop. Enhance either drive with Spin's CD-ROM bundle, including speakers, headphones, CD-ROM titles and more!

Spin 2x Drive with Bundle	\$299
Spin 2x CD-ROM Drive	\$199
Spin 4x Drive with Bundle	\$499
Spin 4x CD-ROM Drive	\$399

### **SmartTerm**

The latest in Macintosh termination technology, SmartTerm's DCR Active Termination ensures data integrity and maximizes SCSI performance. Online status indicators monitor activity and isolate system freezes, while gold connectors provide excellent conductivity. SmartTerm is a smart investment for any Macintosh user.

SmartTerm Active Terminator \$65



### Spin SyQuest 200

The SyQuest 200MB has quickly become the most popular removable drive on the market. Delivering hard drive performance and compatibility with 44MB and 88MB cartridges, the 200MB drive provides the room you need without sacrificing the flexibility and portability that makes SyQuest the industry standard. One cartridge included.

SyQuest 200MB \$449 Cartridge \$79



4% mice rating for our SyQuest 200 and 270!



### **Optical Drives**

Using laser and magnetic technology, Spin MO drives keep your valuable data secure. Spin's 3.5\* Olympus 230MB and 5.25\* NEC 1.3GB optical drives set the standard for speed and capacity. Great for backups, archiving, and as a secondary drive. One cartridge included.



### **PowerBook Drives**

Spin 2.5" drives are fast, easy to install, and offer the capacity you need when you are on the road.

Quantum 127MB	\$219
Quantum 170MB	\$279
Quantum 256MB	\$299
Quantum 341MB	\$359
Quantum 514MB	\$469

# → \$5° OVERNIGHT SHIPPING FOR ANY ORDER UP TO 5 LBS! →

Spin will ship any order to you overnight for just \$1.00 per pound, with a \$5.00 minimum.

If your order is over 21 pounds your price per pound goes down.

# ORDER DIRECT: 1-800-215-9200



### Spin 1021 Hard Drive

MacUser Labs called the Spin 1021 "the fastest drive in this category [1.0 - 1.6GB]... a killer." Better yet, these kind words were written before Spin introduced the stackable Tornado enclosure with DCR Active Termination and a front-mounted power switch. And with our incredibly low prices, these drives will be moving faster than ever.

CAPACITY Spin 1021 1.0GB INTERNAL \$499

**EXTERNAL** 



4½ mice rating for our Spin 1021 hard drive!



### **ATTO Boards**

Video, prepress and other storage-intensive applications benefit substantially from this SCSI-2 BusMaster accelerator that parallel processes with the Mac's CPU. The Silicon Express IV uses RISC technology to push the latest drive mechanisms to their limits.

SE IV with RAIDLine! \$995 SE IV with Drive Purchase \$895



### **Bernoulli Drives**

Based on the new Bernoulli mechanism, Spin's 230MB cartridge drive continues the Bernoulli tradition of rugged dependability while creating a new performance standard for cartridge drives. With a five year warranty on drives and cartridges, the 230MB drive features DCR Active Termination for increased reliability and backward compatibility with older Bernoulli cartridges.

Bernoulli 230MB \$399 Cartridge



Starting At

For A Limited Time

**Award** Winning Performance!

Spin

Spin

### **Hard Drives**

Our external Tornado drives boast a 40 watt power supply, DCR Active Termination, a front mounted power switch, and interlocking feet for stable stacking. Internal drives take minutes to install. Drives over 1GB include RAIDLine! striping/mirroring software.

CAPACITY	INTERNAL	<b>EXTERNAL</b>
Quantum 170MB	\$139	\$239
Quantum 365MB	\$209	\$309
Quantum 540MB	\$249	\$349
Quantum 730MB	\$329	\$429
Micropolis 1.0GB AV	\$759	\$859
Micropolis 4.3GB AV		\$2399
Seagate Hawk 1.0GB	\$649	5749
Seagate Hawk 2.1GB	\$1199	\$1299
Spin 1021 1.0GB	\$499	\$599
Spin 2149 2.1GB	\$1199	\$1299





The best products. Reasonable overnight shipping. Overall value. So go ahead, take a Spin and enjoy.



Spin SyQuest™ 3.5" and 5.25" removable drives accommodate your expanding storage needs without slowing you down. The new 200MB and 270MB continue the SyQuest reputation for convenience and reliability at higher speed and capacity. Small, lightweight cartridges are easy to transport and store.

SyQuest 44MB		Cartridge	\$43
SyQuest 44/88MB	\$299	Cartridge	\$48
SyQuest 200MB	\$449	Cartridge	
SyQuest 105MB	NAMES OF STREET	Cartridge	\$56
SyQuest 270MB	\$429	Cartridge	



4½ mice rating for our SyQuest 200 and 270!

✓ Toll Free Tech Support
✓ 30-Day Money Back Guarantee FAX: 1-617-630-1201 1-617-630-1200





381 Elliot Street, Newton Upper Falls, MA 02164

**ORDER DIRECT: 1-800-21** 

# THE MAC SOLUTIONS HOUSE

Configure Your Own System Package or Choose A Bundle Below



DISCOUNT WAREHOUSE

Self Employed and New & **Established Business Leasing** 



### Power Mac 8100/100 SuperSystem

- · Power Macintosh 8100/100MHz w/ 40MB RAM, 1 GB Hard Drive, CD ROM Drive, 16-Bit Sound) • Radius 20" IntelliColor Monitor
- Epson ES 1200C 30-Bit Color Scanner
   NEW! HP 4MV Laser Printer
- Adobe PhotoShop 3.0 Adjustable Keyboard ABC Software Bundle

### NEW! Quadra 630 Home System \$1695

- Quadra 630 8MB RAM/250MB Hard Drive
   14" Color Monitor
- Extended Keyboard & Mouse ABC Software Bundle

NEW! Power Mac 6100/66 8/350 HD/CD ROM w/14" Hi Res Color Monitor, Extended Keyboard, Mouse ...... \$2295/\$88 p/m\*

\_NEW! Power Mac 7100/80 8/500 HD w/17" Color Trinitron Monitor,

NEW! Power Mac 8100/100 8/1000MB HD w/17" Color Trinitron Monitor, Ext. Kybd, Mouse .... S4555/S128 p/m\*

(310) 325-1422

COMPARE OUR DRIVE PRICES w/Our COMPETITORS!

QUANTUM 270MB Hard Drive...Int s 170/Ext s 245 QUANTUM 540MB Hard Drive...Int \$250 / Ext \$309

88MB/44MB Syquest Drive w/Cartridge.....s349 Quantum 730MB HD.s320 SeagateHAWK 1.0 GB HD.s595

### SCANNERS, MONITORS & VIDEO

MICROTEK ScanMaker III 36-Bit Sacnner w/full PhotoShop .\$2350 EPSON ES 1200C 30-Bit Color Scanner Pro Bundle ......\$1249 SONY 17" Multi-Res Trinitron Monitor.....S895 20" .... S1895 

### PRINTERS & OTHER PERIPHERALS

TEXAS INSTRUMENTS MicroLaser Pro 600dpi, 8ppm .....\$1195 WACOM ARTz 6"x8" Tablet w/Pen..S288 ArtPad 4"x5".....S145 PORTABLE CD ROM BUNDLE: Double Speed MediaVision Port. CD ROM Drive (Batteries, AC Adapter & Headphones Included) w/Grolier's Encyclopedia, World & US Atlas, Animals, & Oceans Below ... S399



Anril 1995

NEW! POWERBOOK 540c Power Package! THE ULTIMATE, TOP OF THE LINE POWERBOOK POWERBUNDLE AT AN AMAZING PRICE

- PowerBook 540c (33MHz 'LC040, 12MB RAM, 525MB Hard Drive, \$133 640x480 Color Active Matrix Screen, Two Intelligent Batteries)
- Global Village Mercury 19.2 Modern
- Tenba Deluxe Carrying Case
- HP DeskWriter 320 Port. B/W & Color Printer ABC DELUXE PowerBundle:

Symantec GreatWorks, Connectix CPU, Norton Utilitie Hard Drive Utility Software , and a Surge Suppressor. PowerBook 520c Power Package (same as above, but with

PowerBook 520c 8/340)..... ....\$3849/\$108 p/m\*

PowerBook 520 Power Package (same as above, but with PowerBook 520 8/240)..... ...\$3195/\$90 p/m\*

PowerBook 150 8/120HD System with Supra 14.4 Internal FAXModem .... .51789

MORE THAN 10 YEARS OF COMPUTER EXPERIENCE

Advance Business Center • 23510 Telo Avenue, Suite 5, Torrance, CA 90505

fax: (310) 325-4073

PowerMac

Compatible.

2-year warranty.

Circle 225 on reader service card

### DIGIAXIS@ONR.COM

# DIGITAL AXIS INTERNATIONAL

Ikegami 21" Flat, Multi-Sync . . . . \$2185

With 24-bit Accelerator Card . . . . . \$999

75hz! RISC-based Graphics Cards. Blazing SPEED! PhotoShop Acceleration!

Kodak CD-Writer ..... S CALL

### Wacom

Pressure-sensitive Graphics Tablets 12"x18" Standard/Electrostatic .....\$659/\$795 4"x5" ARTPAD .....\$149 6"x8" ARTZ ......\$299 12"x12" .....\$499

Painter 3.0 \$269 With purchase of Scanner or Wacom Tablet



Photoshop 3.0.1

(full version) With purchase of Scanner or Wacom Tablet

\$209



Microtek 45T Slide Scanner . . . S5199 Microtek Scanmaker III .....\$2549 Microtek Scanmaker IIhr .....\$829 Microtek Scanmaker Hsp .....\$529

International Dealers Welcome

Wire transfer, COD accepted, Credit card fees may be assessed. Prices sub-incr to change without notice. UPS, FedEx, DHL Z-day to Europe.









212 April 1995 MACWORLD

Gemini - Dual Lens, One pass Scanner .... \$1489 UC 630/UC 840 BLOWOUT! ....\$509/\$539 Vista S6 - 600dpi One-Pass Scanner .....\$699 Vista S8 - 800dpi One-Pass Scanner .....\$799 Powerlook - 1200dpi One-Pass Scanner ...\$2199 

512-329-7001 800-247-4678 Fax 512-327-0921 5000 Plaza on the Loke, Ste 250, Austin, TX, USA 78746

DIGITAL

Circle 83 on reader service card

# Magic PowerClock™ Power Mac Accelerator



Take your Power Mac to the limit. PowerClock accelerates your Power Mac by up to 40%. Total compatibility. User-installable in seconds with fail-safe instructions. Clips in place. 30 Day MBG.

Accelerates your PowerMac 6100, 7100 or Performa 61xx to 84 MHz

# MacUser Recommends Magic SyQuest



Magic SyQuest 270 \$399

3.5 inch storage solution. 12 ms access time.

SQ270 Cartridges 10 Pack \$62



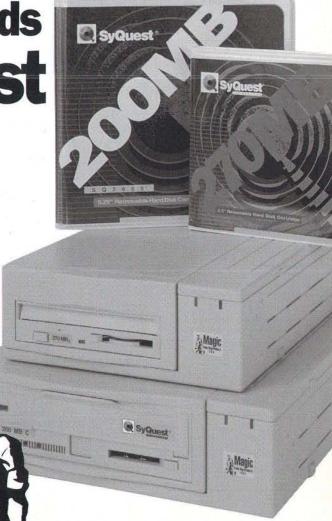
Magic SyQuest 200 \$419

5.25 inch storage solution. Backwards compatible with 88MB and 44MB cartridges. SQ200 Cartridges 10 Pack

**MacProducts USA** 1-800-347-8750

512-892-4070 Fax. 512-892-4455 Internet: sales@max.dgr.com 4544 S. Lamar Blvd., Suite 100, Austin, Texas 78745

Circle 65 on reader service card



MACWORLD April 1995 213



# MEGAHAUS 1-800-786-1184

- Low price guarantee!
- Selling quality drives at incredibly low prices Since 1987.
- 30 Day money back quarantee.
- Fast service. Most orders shipped same day!
- Lifetime technical support.
- 24 Hour turnaround, 1 year replacement policy.
- Friendly, helpful staff. We appreciate your business!

### **OPTICAL DRIVES**

### 230MB FUJITSU

- Read and write 128 or 230MB disks
- DynaMo drive in portable size case. External only \$799 1 free disk

### 1.3 Gig NEC

- Read and write 650MB or 1.3Gig disks
  2 Year warranty! 1MB data buffer.
- External only \$1839 1 free disk

### 1.3 Gig Maxoptix

- Read and write 650MB, 1Gig or 1.3Gig disks
- 4MB data Buffer. 1 year warranty. External only \$2299 1 free disk

### RAIDTEC DISK ARRAYS

- Just say NO to software driven arrays!
- Hardware driven arrays are much faster! Software arrays may require an upgrade
- if you upgrade your operating system.
  RaidTec SCSI to SCSI disk arrays support
- any computer and any operating system.

  Available in unlimited capacities in most RAID levels. Call our profesionalls for a quote on one of these quality solutions. 2 Gig Striped from \$2099 2 Gig Mirrored from \$2999

### (I) PIONEER

### **EXTERNAL CD ROM CHANGERS**

2X 300ms DRM602X 6 Disc DRM604X 6 Disc 4X 300ms \$989 300ms DRM1804X

ATTENTION: POWER MAC OWNERS

New 6100 ZFP case fits perfectly under your Power Mac 6100. Holds up to 4 drives.

		1 0 44	O1 100	SOIL DI	1400
	Size	Speed	RPM	Brand	Price
	240MB	14ms	4500	Fujitsu	\$255
	256MB	17ms	4500	Quantum	\$272
0	514MB	17ms	4500	Quantum	\$435

**#1 HARD DRIVE Capacity** 365MB 11ms FOR MAC! 540MB

14ms 541MB 11ms 731MB 11ms 1080MB 9.5ms 2140MB 8.6ms 2160MB 9.5ms MegaHaus is your #1 source for Quantum drives.

Low price guarantee on all Quantum drives!

Same day shipping on most orders!

**Buffer** Model Internal External 4500 128K LT3655 \$189 \$249 2yr 3600 128K 2yr MV540S \$243 \$303 4500 128K 2yr LT540S \$249 \$309 4500 128K 2yr LT7305 \$289 \$349 BEST 5400 512K 5yr **EMP1080S** \$550 \$599 7200 512K **GP2140S** \$1079 \$1179 5400 \$909 512K **EMP2160S** \$969 5yr **GP42805** 



es Car
0 88/ 5 105 0 200
6) 270

acity Speed MR 20ms 5MR OMB 18ms

14.5ms

MegaHaus is your #1 source for Syquest drives.

- Low price guarantee on all Syquest drives!
- 1 FREE cartridge with each drive!
- · 2 year warranty on drive and case!
- 5 year warranty on all cartridges!
- Same day shipping on most orders!

	Compatible	Model	Buffer	Internal	External
	44, 88MB	SQ5110C	32K	\$285	\$345
į	105MB	SQ31055	64K	\$249	\$309
	44,88,200MB	SQ5200C	64K	\$419	\$479
í	105, 270MB	SQ3270S	128K	\$409	\$469





### FUJITSU OFFERS THE BEST VALUE ON THE MARKET!

- · Low price guarantee on all Fujitsu drives!
- THESE PRICES ARE NOT MISPRINTS!

Capacity	Speed	<b>RPM</b>	Buffer	Wty	Model	Internal	External
530MB	13.8ms	4500	256K	2yr	M2684S	\$230	\$280
1080MB	9.5ms	5400	256K	5yr	M26945	\$490	\$550

**RPM** Buffer Capacity Speed 2050MB 8.5ms 7200 512K 4294MB 7200 512K 8ms

Micropolis is THE high performance drive for your Mac! · Low price guarantee on all Micropolis drives! Add \$100 for A/V version of drives. WIDE SCSI call. Wty Model Internal

External \$999 SALE MC4221 \$899 5yr MC3243 \$1599 \$1699 9100MB MC1991 \$3099 5400 512K \$2999 12ms

A Seanate

Seagate offers incredible performance and durability. Low price augrantee on all Seggate drives!

W Stagate			zon price goaraniee on an ocagare arrives.				
Capacity	Speed	RPM	Buffer	Wty	Model	Internal	External
1050MB	9ms	5400	256K	5yr	ST31200N	\$540	\$599
2148MB	9ms	5400	256K	5yr	ST12400N	\$979	\$1039
2147MB	8ms	7200	512K	5yr	ST32550N	\$1115	\$1215
4290MB	9ms	5400	512K	5yr	ST15230N	\$1599	\$1659
4290MB	8ms	7200	1024K	5yr	ST15150N	\$2159	\$2259
9090MB	11ms	5400	1024K	5yr	ST410800N	\$3079	\$3179

Brand Model Speed Transfer Buffer Internal External SH93R 280ms 330KB/sec 256K \$219 Sanyo \$149 Toshiba XM3501 155ms 600KB/sec 256K \$309 \$379 BEST

Complete external DAT drive includes Retrospect 2.1, 1 tape, terminator, and cable. 2Gig DDS DAT Conner \$949 WangDat \$769 BUY! Hewlett Packard \$879 4-8Gig DDS-DC DAT WangDat \$899 Conner \$989 **Hewlett Packard \$999** 4-10Gig DDS-2 DC DAT WangDat \$989 **Hewlett Packard \$1169** Conner \$1079 OPTIMA DeskTape Software mounts DAT tape drive on your desktop to use as a standard drive! \$275



M-F 7-8 Sat 9-3 Central Local (713) 333-1910 Fax (713) 333-3024 TTY 1-800-473-0972

**CODE MW04** 

2201 Highway 517 Dickinson, Texas 77539

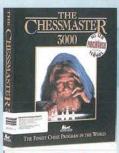
Circle 245 on reader service card

# You have so many reasons to try The Mac Zone!







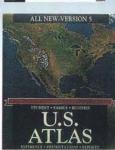


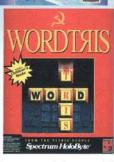


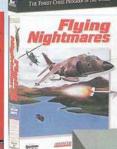


6 exciting titles

when you buy the Performantz Quad Speed CD-ROM Drive.







Price slashed. Only #01124 Was \$489.98

ake maximum advantage of these and other realistic games, multimedia and educational CDs with our lowest price ever on the Performantz Quad-Speed CD-ROM drive – an unbelievable \$299! It has a 600 KB/sec Data Throughput and the highest rotational speed of any drive in the world - twice as fast as double speed drives! Order yours today and start spending less time waiting and more time enjoying the total multimedia experience.

# Over 2.500 products in stock

Including new versions and all the latest releases for your Mac. New products every month! Software, hardware, peripherals, accessories... everything you need to be more productive at work and enjoy your play more.

### Shop 7 Days a Week, 24 Hours a Day in the comfort of your own office or home.

# **30-Day Money-Back Guarantee**

on many of our products. If you're not completely satisfied, please contact us.

### **Lowest Catalog Prices or we** give you FREE SHIPPING!

Any competitive catalog price comparison must include shipping charges.

Multiple Zones International, Inc. All rights reserved

# **Next Day Delivery only \$3**

no matter how much you order!



# **FREE Catalog Subscription**

Get a FREE One-Year Catalog Subscription. Stay up-to-date on the latest innovations and all the best buys in the industry. To get your FREE subscription, just fill out and mail in the coupon below.

Before you buy, call The Mac Zone

For the best Macintosh products at better than Warehouse and Superstore prices.

Fax (206) 603-2500 • International (206) 603-2550 • CompuServe code: GO MZ

CORPORATE SALES 1-800-405-9663

**GOVERNMENT SALES EDUCATION SALES** 1-800-371-9663

1-800-381-9663

INTERNATIONAL SALES 1-800-603-2570

e-World

### Trusted Name Internationally

	Jimail Jimail J
Middle East - 971 4 359 800Fax: 971 4 359 997	<ul> <li>Mexico – 525 611 4646Fax: 525 563 5025</li> </ul>
Indonesia - 62 21 530 4567Fax: 62 21530 4715	<ul> <li>Hong Kong – 852 2851 1750Fax: 852 2581 0359</li> </ul>
France - 33 14688 4040	<ul> <li>Japan – 81 3 5454 7926Fax: 81 3 5454 7919</li> </ul>
Germany - 49 40 551 6066	<ul> <li>Benelux – 31 20 626 2299 Fax: 31 20 626 5888</li> </ul>
United Kingdom - 44 483 211 456 Fax: 44 483 211 567	<ul> <li>Spain – 351 1 387 4558Fax: 351 1 386 3801</li> </ul>
Scandinavia - 45 86 11 81 83Fax: 45 86 11 81 33	<ul> <li>Brazil – 55 192 3459 86Fax: 55 192 3459 86</li> </ul>
Switzerland - 411 401 4070(71,72)Fax: 411 401 4073	<ul> <li>Columbia – 57 1 215 15 10, 215 15 12Fax: 57 1 215 15 90</li> </ul>
Portugal - 351 1 387 4558Fax: 351 1 386 3801	<ul> <li>Venezuela – 58-2-713197Fax: 58-2-7694970</li> </ul>

MW504 PLEASE USE THIS CODE TO RECEIVE THESE SPECIAL PRICES Circle 71 on the reader service card

1	YES! START MY	FREE 1-YEAR	CATALOG SUBSCRIPTION AS	SOON AS POSSIBLE:
١	MAC TONE	TI DC TONE	COPPORATE TONE	THEADNING 701

MAC ZONE	PC ZONE	CORPORATE ZONE	LEARNING ZON
Name			
Address		Apt	
City		Stat	е
7in			PARTICIPATION OF THE PARTICIPA

Mail to: The Mac Zone, 15815 SE 37th St., Bellevue, WA 98006-1800

MW504

# ALL Prices 5% Above

# BUSINESS LEASING

### Warrantied/Updated technology at your fingertips

BECAUSE 80% OF AMERICAN COMPANIES LEASE, DIGICORE HAS CREATED THE ULTIMATE LEASE PLAN. ADMINISTERED BY TRICON CAPITAL CORPORATION

- Any established business can lease
- Purchase options are available Warrantied equipment for lease term
- Quick approvals & deliveries Flexible terms No Down Payment
- Low fixed monthly payment
- · Aggressive pricing

### The Initiate



PowerMac 6100/66, 8-350 w/CD 15" Multiscan Display Extended Keyboard SyQuest 270, external



### CyberMac 81 Workstation

PowerMac 8100/100AV, 16-1000 CD 20" Multiscan Display Supermac GX 1152



Extended Keyboard SyQuest 270, external

### The Enterprise 7101

PowerMac 7100/80, 16-700 w/CD 17" Multiscan Display

Extended Keyboard SyQuest 270, external



### Demon Workstation 8110



PowerMac 8100/110, 16-2000 CD 21" Multiscan Display Supermac GX 1600 VideoVision 2 Pro Pak w/4.2 GB Array Premiere 4/VideoFusion Extended Keyboard Apple Design Speakers



<b>PowerMac</b>		Lease
6100/66, 8-350	1576	52
6100/66, 8-350 w/CD	1758	58
6100/66AV, 8-350 w/CD	2156	71
6100/66, 16-500 w/DOS	2390	78
7100, 8-500 w/CD	2295	75
7100/80, 8-500	2512	82
THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TRANSPORT OF THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TW	25000000	1 60 TX EDIT

7100/80, 8-700 w/CD 2806 7100/80AV, 16-700 CD 3317 109 8100, 8-500 2695 88 8100, 16-500 w/CD 3195 105 8100/100, 8-700 3143 103 8100/100, 16-1GB w/CD 3873 127 8100/100AV, 16-1GB CD 4060 133 8100/110, 16-2GB w/CD 5419 178

Quadra 950, 8-0 88 2672 Quadra 630, 4-250 1028 34 Performa 6115CD 2595 86 Performa 575, 4-250 1625 53 Performa 475, 4-160 1095 35

### **Monitors**

Apple 20" Multiple Scan 1826 60 Apple 17" Multiple Scan Apple 14" AV Clr Display 968 32 549 17 Apple 15" Multiple Scan 479 14 Apple 14" Color Plus 295 Supermac 21 • TXL 2010 66 Supermac Pressview 21 T 2999 98 Radius IntelliColor/20e 1795 62 Radius PrecisionColor 20V 1399



Radius PrecisionColor 17	975	33
RasterOps ClearView 17	836	27
Sony 17SE1	989	32
Sony 20SE1	1895	62
Sony 15" SF	495	15

# Video Boards

Supermac T-II GX1600	2699	88
Supermac T-II GX1360	1995	63
Supermac GX1152	1895	75
Radius Thunder IV cards	call	1-
n I' we I n aw	1200	140

Radius P'Color Pro 24X	1300	43
Radius P'Color 24XP	469	15
Radius VIDEO VISION v2	3350	109

# with CPU purchase a \$89 Value WG Servers

Lease

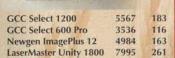
6150, 8-500 w/CD 72 8150, 8-500 w/AppleShare 4044 133 5188 170 9150, 8-2000 w/CD



" OWN CANODING		reme
150, 4-120	1349	-
520, 4-160	1966	64
520c, 4-160	2512	82
540c, 4-320	3585	11
540c, 12-320 w/modem	4111	13
280с, 4-320	3193	10.
280c, 12-320 w/modem	3652	12

# 

rinters		Lea
StyleWriter II	295	
Color StyleWriter 2400	589	1
HP 4MV	2699	8
HP 4MP	1299	4
LaserWriter 16/600	2095	6
LaserWriter 300	575	1
LaserWriter 360	1099	3
THE RESERVE TO SHARE THE PARTY OF THE PARTY		



### Scanners

899	29
2599	85
990	42
825	36
999	33
2675	88
850	28
1759	58
	2599 990 825 999 2675 850

# Opticals/Storage Lease

Pinnacle RCD 1000	1799	66
Pinnacle Tahoe 230	999	33
SyQuest 270 ext	429	14
PLI SyQuest 200c	599	20
Plextor 4Plex CD-ROM	649	21
FWB HammerDAT2000	1395	46
Radius 4.2 GB Pro Array	5600	184
1 GB Apple Hard Drive	579	19
1.7 GB Micropolis	880	29
2.1 GB Seagate 'Cuda 2	1140	37
4.3 GB Seagate 'Cuda 4	2275	75

Toll-Free

### CD-ROMs

### Arts

4.95	Macbeth
4.95	Xplora 1
4.95	MS Art Gallery
9.95	American Visions
9.95	Prince Interactive
2.95	The Orchestra
4.95	Freak Show
8.95	Rosetta Stone PowerPac
4,95	Salt of the Earth
9.95	A Hard Day's Night

The Complete Maus MS Musical Instrume Biz

PhoneDisc Powerfinder
Take Five
Great Business Jokes
AccuZip6

499.95

44.

44,95

34.95 29.95

29.95 19.95 44.95

49.9

69.95

### **Kids**

EXPERTE

SIAIL

10.	THE WHITHOUGH
15	Mario Is Missing!
15	Amazing Animations
15	Arthur's Birthday
15	Ruff's Bone
15	Little Monster <sup>1M</sup>
15	Just Grandma and Me
15	Harry & the Haunted Flouse
15	Arthur's Teacher Trouble
95	The Tortoise and the Hare
25	The New Kirl on the Block
95	Word Tales
95	Cosmic Osmo
95	Peter and the Wolf

# arenting (Prenatal to Preschoo

omic Book Confidential

DinoSource

	Life (Nature)
	The Animals
	From Alice to Ocean
	Prehistoria.
	The Rainforest
	OceanLife Vol.4: Great Barrier Ree
	OceanLife Vol.3: Hawaiian Islands
,	Audubon's Birds
	Audubon's Mammals
	Oceans Below
	Woodstock
	Whales & Dolphins

### Play (Games)

	Myst
	Cosmology of Kyoto
	Marathon Man
	Star Trek 25th Anniversary
	Next Generation Tech Manu
	Baseball's Greatest Hits
	Gadget
	Indiana Jones-Fate of Atlan
	Iron Helix
	The Chessmaster 3000
	MS Cinemania 194
	Rebel Assault
1	Wrath of the Gods
	Where in the World Is
14	Carmen Sandiego?
1	The 7th Guest
	The 11th Hour
	C.H.A.O.S. Continuum
	Jump Raven
	Funny
	Return to Zork
	Lunicus
	Saturday Night Live

### Reference

Grolier's Encyclopedia v6.0 Grone's Encyclopedia v6.0.
The Viow From Earth
Mayo Clinic—Family Health Book
Mayo Clinic—The Total Heart
Macintosh Product Registry Exploring Ancient Cities Compton's '95 World Atlas US Atlas Capitol Hill Warplanes Redshift Space Shuttle Guinness Records '94 The First Emperor of China Who Built America?



Over 2600 Apple products to choose from — please call for unlisted products

Due to publication time constraints prices may vary • All Prices Reflect CASH DISCOUNT • No Sales Tax EXCEPT in CA • Live Operator on duty • Hours: Mon-Fri, 6am to 6pm, 24 hr FAX LINE • FREE Subscription to DigiCore Catalog, no purchase necessary • Non-Defective Returns or Shipped Orders may be subject to Restocking Fee •

Shipping and service fees are non-refundable •
Leuse prices are approximate based on 36 months (on approved credit) •
m manufacturer's warranty on parts and labor unless otherwise specified •

Circle 269 on reader service card

We Accept ALL Major Credit Cards







Call for FREE Catalog

800-858-4622

ph 818-785-2800

fx 818-785-3100

DigiCore Inc 15500 erwin st #2002 van nuys ca 91411

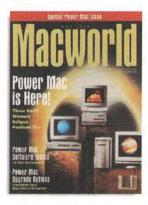
Order



Macbeth

# Congratulations

to the Winners of the 9th Annual Computer Press Awards!



Best Computer Magazine (Circulation more than 100,000)

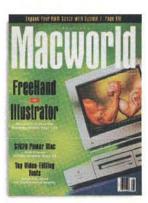


Best Computer Newspaper (Circulation more than 100,000)

in a Computer
Publication
("DOS 6.0" by
Stuart Johnson,
Doug Barney and
Kevin Strehlo)

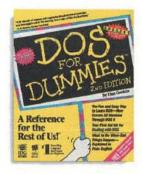


Best Computer Columnist (Deborah Branscum, "Conspicuous Consumer")





Best Advanced How-to Book: Systems



Best Introductory How-to Book: Software

Once again, IDG dominated the annual Computer Press Awards, winning more awards than any other publishing company. If you're looking for editorial excellence in information technology publications, IDG is where you find it.



INTERNATIONAL DATA GROUP Where you find I.T.

KOREA

PHILIPPINE

SINGAPORE

THAILAND

CANADA

AUSTRIA

# We'll Give You Expert Advice,

# **But, If You'd Rather**



Number One Mac Systems Mail Order Reseller 5 Years Running





\$4399

Power Macintosh 8100/100AV with CD ROM Drive 16MB RAM, 1 GIG HD, includes Ethernet & FPU.

\*Add RadiusThunder IV GX\*1600 24-bit graphics accelerator w/ DSP's, Radius 21\*TXL Display, Extended Keyboard & System 7. 5 Complete System Price \$9689 Lease for \$344/ month\* Whether you need a system for desktop publishing, professional pre-press applications, digital video production or simply business productivity - Express Direct can custom configure a Mad System that's right for your specific job and right for your budget. And remember, all Macs aren't created equal! At Express Direct we do more than take orders and ship boxes. We install the memory, video card and system software. Then we test every System - so all you need to do is plug i in! And only Express Direct gives you Toll-Free Technical Support with every Mac!



We stock a complete line of quality products from all of the above manufacturers & more.

1 • 800 • 765 • 0020

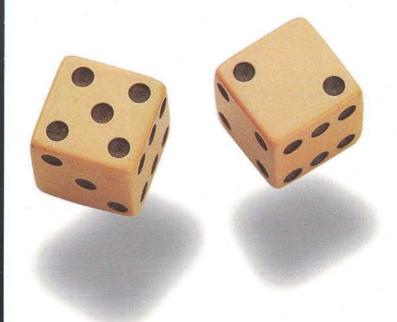
Express Hours (CST) M-Th 8am-7pm, Fri 8am-6pm • 24hr Fax • Tech Support Hotline: 1-800-236-3059

Apple, the Apple logo, Macintosh Macintosh Macintosh Macintosh Computer in the Apple Computer, Inc. Prices are subject to change without notice. A 2% surcharge applies to American Express purchases. All neumed orders may be softient to a 15% restocking fee plus return-shipping. Call for RMA before returning. Software, unless defective, cannot be returned after it has been opened. All warrantees on Macintosh or Apple bran products sold by Express Direct or its authorized agents. All other manufacturers warranties still apply. \*Extended Service Plans are optional and available for an additional cost, Call for complete details. \*Lease price based on 36 month lease with \$1.00 purchase option. Call for details.

Order

# Outstanding Service, and Support.

# **Gamble...Turn the Page**











coverage

 Authorized service & sales



 Flexible payment & leasing terms for those who qualify



International Orders Shipped Daily

Fax: 312.244.3081 Ph.: 312.244.3000

# We'll give it to you straight.

When it comes to product knowledge and understanding the needs of graphic professionals – **nobody even comes** close to Express Direct. Not the other mail-order companies, not the superstores, not even your local dealer.

When you call us - **you'll talk with an expert.** Someone who's done their homework, knows the product, knows what they're talking about. Not an order-taker, like you get with the other mail-order companies.

We carry only top-notch products from the industry's best manufacturers. No garbage. You demand quality and so do we. What's more, our strict criteria for selecting products means we always get the lowest price – directly from the manufacturer. So **nobody can give you a better value** than Express Direct.

But that's just the beginning. With customer service and technical support that's the best in the industry, we make it our business to take care of you. All this is just a free phone call away. So, call Express Direct today. You're going to love working with us!

# express direct

2720 N. Paulina Ave. Chicago, IL 60614

Call to receive a FREE catalog!

## **PRODUCT INDEX**

## **BUSINESS TOOLS**



Category	Page No.
ACCESSORIES Diskettes	240
BUSINESS TOOLS  Bar Code Cataloging Software Credit Authorization LCD Panels Medical Point of Sale Presentation Real Estate	220-222
EDUCATIONAL & RECREATIONAL Astrology Discount Software Genealogy Grading Music Religion	240-242
GRAPHICS CD ROM Photos Clip Art Graphics Translators	242-244
MOBILE COMPUTING & PowerBook Cases	PDA'S239

Security Systems

Category Page No.
MULTIMEDIA & CD-ROM242
CD ROM
NETWORKING &
COMMUNICATIONS240
BBS
ISDN
PROGRAMMING &
UTILITIES
Data Compression
Languages
SERVICES & SUPPLIES 244-246
Computer Insurance
Computer Repair
Data Recovery
Ink-Jet Refill
Prepress Services
Slides
SYSTEMS &
PERIPHERALS
Hard Drives
UPGRADES & MEMORY234-239

ACCOUNT MANAGERS:	800.888.8622
Carol Johnstone	415.978.3152
Shannon Smith	415.974.7414
Niki Stranz	415.978.3105
DTP COORDINATOR:	
Clayton Haberman	415.978.3132
OVER	THE RESERVE
1/2 MILI	LION
ACTIVE BUYER	
WHAT THE	Call Control Con
LOOKING	
IN THE	
MACWO	
I SHOPPER SI	





Creating

precision

as easy as using a font!

bar codes is

PRINTBAR™

Macintosh application.

· POSTNET/FIM.

Choose from: • UPC/EAN/ISBN

90-day money back guarantee.

. Code 39 . Interleaved 2 of 5



## Comes complete with wand

- and 5 year warranty.
- Scans information directly into software application.
- Available with laser gun, CCD, badge slot, magstripe options.
- No software required. Ready to use in minutes!
- Money back guarantee.

**Bear Rock** TECHNOLOGIES

Call the Bar Code Experts

800 232-7625

CIRCLE 578 ON READER SERVICE CARD





# - **VirtualDisk**<sup>™</sup> - Completely Automatic Cataloging

Know where every file is on every disk you own without any effort on your part.

VirtualDisk automatically catalogs all disks and removable media as encountered. You don't even have to launch an application. Your catalog is always available in compact alias form on your desktop. You can search, view, or open any file on any off-line disk with simple Finder commands.

Along with an improved interface version Along with all hippowed interface versions.

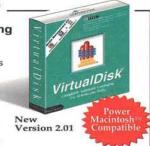
2.0 offers faster cataloging, more user controls, multiple catalogs and the ability to catalog inside popular archive formats and Retrospect™ back-up logs.

...the best solution to your disk-cataloging woes. Macworld, July 94

MW \* \* \* \*

MADINE MADE

CIRCLE 408 ON READER SERVICE CARD



Macwarehouse: 800-255-6227 APS: 800-947-8599 MacZone: 800-436-0606 Mac'sPlace: 800-914-0009

#### The Recognized Macintosh Bar Code Experts

#### UniScan-300 ADB Bar Code/Mag Stripe Reader \$295

(industry's only lifetime warranty)

Complete with wand and bar code printing software.

Compatible with all Macs from 128K to current models.

Inventors of keyboard interface bar code reader for Macintosh. VISA

LM-300 Integrated Laser

Plug and play laser. Draws power from the ADB port.

\$795

30-Day Money-Back Guarantee on All Products Established 1978 - Newton Scanners and Software Available Now! Discounts for Resellers, Schools, Non-Profit & Government Agencies

2495 Old Middlefield Way, Mountain View CA 94043 Phone (415) 988-0141 Fax (415) 988-0289

Electronics

(800) 526-5920 AppleLink: BARCODE

CIRCLE 441 ON READER SERVICE CARD

# Project Wall-Sized Multimedia

Only \$3,799.

Introducing the BOXLIGHT ProColor 1500 Multimedia Projection Panel. Fullcolor, big-screen multimedia and video projection with

> built-in audio! Industryleading performance at special introductory price of only \$3,799!

- Active-matrix color
- · Built-in video & audio
- · Rugged & portable
- ♦ PC & Mac Compatible
- Unbeatable price

Your direct source for all the bright answers.

SPECIAL OFFER!

- Widest selection
- Instant availability
- Overnight shipping 30-day guarantee

BOXLIGHT CORPORATION

Fjord Dr. N.E., Poulsbo, WA 98370 79-7901 \* Payment, VISA, MasterCard, can Express, COD and Purchase Order restrictions! Leasing and rental option ble, 30-Day Money, Back Guarantee.

Call Today 1-800-762-5757

#### MacLandlord New Version

ntroductory Sale: \$239 f ordered by February 28, 1995

Regularly \$399 Property management & bookkeeping program

Easiest-to-use Prints notices, checks, receipts

Many reports Free telephone support

30 Day money-back guarantee abana Management Company

P.O. Box 2037 Dearborn, MI 48123 313/562-6247

## Join the Mac-Barcode® Family!

The Only Complete Barcoding System with Friendly Support from the Experts. Simple, Fast and Accurate! The Mac-Barcode Co. 800-733-7592

Call for Literature and Free Demo Disk FAX 617-934-6233

Mac-Barcode ProLabel

Software Intuitive & Easy to Use

**SmartScanner Thermal Transfer SmartPen** 

Printer · Rugged & Dependable · Industrial Strength Readable Codes Guaranteed - No Decoder Boxl 203 or 300 dpi

CIRCLE 562 ON READER SERVICE CARD

## StickyBusiness® Plus

Bar coding and labeling at a price you can afford

Quickly design professional quality labels, cards, tags and envelopes.

 Bar codes, text, graphics, serial numbers, postal formatting, rotation, and merge features
• Includes 45 bar code fonts: Code 39, 128. ITF, UPC, EAN, ISBN, OCR-A, OCR-B, USPS Certified PostNet, and FIM.

Special Price! Knows over 700 paper product formats or add \$145.00 your own.

ORDER NOW! 800-752-4400 (509) 624-5170 • Fax (509) 623-4276 Williams & Macias, Inc.

CIRCLE 433 ON READER SERVICE CARD

#### ELECTRONIC MEDICAL RECORDS

You ARE ready for a computerized nedical chart. CARE4TH® PRO will revolutionize your practice. A nature, reliable, doctor-designed program, it feels like a chart, yet is stoundingly powerful. Hundreds of our colleagues in 43 states already know this. Single/network versions, Mac/Native PowerMac, starting inder \$2800!

Med4th Systems, Ltd. 1165 West Green Tree Road Milwaukee, WI 53217

414/351-1988 Fax: 414/351-1954 We Help Perplexed People Buy Macs

THE MAC BUYER'S JOURNAL

1-800-813-7459

- We research the lowest prices We tell you the best places to buy
- Covers new/used, PowerMac, Quadra, PowerBook, monitors, printers & more Tips on how to save money
- Ideal for anyone interested in Macs

Less Than \$2.50/Issue — 12 Issues/Year Single Issues & 6-Month Trials Available Visa/MC Accepted • Money-Back Guarantee

CIRCLE 412 ON READER SERVICE CARD



POINT OF SALE INVENTORY CONTROL

- Software & Hardware for Retail
   Manufacturing
  - Service Industry
     Kiosk Developers

New Bar Code Wand Only \$225 Bar Code/Magnetic Stripe Readers Receipt Printers • Cash Drawers Credit Card Auth. & Deposit Software New Electronic Catalog & Fax on Demand call or fax for a FREE CATALOG (800) 622-7670

(618) 985-8237 TÉL • (618) 985-3014 FAX Dealer Inquiries
Welcome
30 day MBG P.O.S.

DIRECT

## Credit Card

Authorization & Electronic Deposit Software

- Save hundreds, if not thousands of dollars.
- Automatically authorizes and deposits all credit card sales -- individually or in batches Integrate with your sales system with
- AppleEvents, AppleScript & import/export

MacAuthorize

• Single and Multiple User Versions• POS Credit Developers since 1981 800/483-5526 • 408/274-1110

CIRCLE 480 ON READER SERVICE CARD

## **BUSINESS TOOLS**

## SYSTEMS & PERIPHERALS





Taking control of your business is easy with a system that

has been designed and proven by thousands of retailers just like you. POS•IM provides full POS and Inventory Management functionality with the features you need at an outstanding price.

S.

Point-of-Sale • Inventory Management

Ensign Systems, Inc. (801) 546-1616

The One That Apple® Uses CIRCLE 417 ON READER SERVICE CARD

# **Bar Coding**



Portable & Non-Portable Readers

Radio Frequency Readers

PostScript Bar Code Fonts

800-345-4220

Create EPS graphics for your desktop publishing documents. Call for a free demo disk and get the information you need to make an intelligent purchasing decision

800.619.0399 718,499,6293 or fax 718,768,3997



CIRCLE 450 ON READER SERVICE CARD

#### Fast Systems

#### 800-508-4444



Tel. (508) 653-6911

Fax (508) 650-1872

Distribution

EES Companies, Inc.

#### Point-of-Sale

- Order Entry

- Credit Card
- Processing
- ► Inventory Control Invoicing Barcoding
  Fast Cash Retail Multi-User ► Barcoding
- Purchase Order Complete Systems
  - Available

Demo Available

CIRCLE 600 ON READER SERVICE CARD

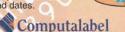
#### The Experts Choice for Barcoding!

#### **Bar Code Generation** Mac BARCODA

The highest precision barcoding package available for the Mac.

#### For Sheet-fed Labels

Easy to use, prints any label with barcodes, text, graphics, numbers (Label Designer) and dates.



28 Green Street, Newbury MA 01951, Fax 508-462-9198

CIRCLE 544 ON READER SERVICE CARD

Prints short-run labels on reels with barcodes, text, graphics, numbers and dates. Compatible with the full range of Zebra Printers.

#### **Bar Code Readers**

For Reel-fed Labels

A complete line of bar code scanners starting at \$255

Call toll free 800 289 0993

New / Used Mac's **High End Custom setups** 

**Get CASH for Your M** Power PC Softwar

Trade-in your
Adobe photoshop
Microsoft Office
Addus PageMaker
Addus PageMaker
MicroSoft Word
Addus PageMaker
MicroSoft Word
Addus PageMaker
A **PowerMac** 

Microsoft Excel Quark Xpress SoftWindows

285 585 269

Infinity Micro Computer Tel:(310) 289-8288 Fax:289-0832

CIRCLE 422 ON READER SERVICE CARD

(800) 299-MACS (800) 299-6227 409.690.5353 (Fax) 409.690.5345 (Intl. Sales)

Contact Us Via Internet! MASales@aol.com

Prices subject to change — please call for latest pricing. We carry hundreds of items — call for availability. Your satisfaction is our goal. Same low price — cash or credit. Prices are subject to change. International Orders and Fax Orders Welcome! Powerbooks

# **PowerMacs**

- PowerMacs 5100/66 8/350 CD 5100/66 8/350 CD 5100/66 16/500 DOS CRD 7100/80 8/500 7100/80 8/700 CD 7100/80 16/700 CD AV 8100/100 8/700 TO AV 8100/100 16/16 CD AV 8100/100 16/16 CD AV 8100/100 16/16 CD AV
- Quadras

#### Quadra 630 4/250 Quadra 950 8/0

Monitors

scan 20 Display T 16 Great

#### Printers

riet 451 riet 451 MX

# Duo Dock II 150 4/120 Duo 280c 4/320 Duo 280c 12/320 Modem 520 4/160 520c 12/320 Modem 540c 4/320 540c 12/320 Modem 540c 12/500 Modem 540c 12/500 Modem \$2526 \$2526 \$2655 \$2966 \$3506 \$3322 \$4095

#### Modems

Scanners HP Scanjet IIP \$737 HP Scanjet IIC \$989 Apple One Scanner \$628 Apple Color One Scanner \$870 AGFA Studio Scan II \$855 Other AGFA Scanners \$CALL

## Keyboards

CDs
Apple CD 300 Plus External \$306
Apple CD 300i Plus \$289
Apple CD Multimedia Kil \$421

#### Other Stuff

lomega Catridges 44/88 MB \$52/62 Kensington Turbo Mouse \$110 Apple Quick Take 100. \$673 Cuadra 630 Multimedia Acoss \$CALL PLI (Syquest) 44, 88, 200,270 \$CALL

#### FREE Mousepad With Every Order !!

We ship Federal Express. International shipments handled by OHL. COD, Mastercard, and VISA accepted. Hours: MF, 8-7 CST. 159: Restocking Fee For Returned

Call Today About Other Great Product Offers!! CIRCLE 438 ON READER SERVICE CARD

#### WE BEAT ANY PRICE!



#### POWER PC

Quadras & Powerbooks DISPLAYS, SCANNERS PRINTERS, MODEMS

DEALERS AND INTERNATIONAL SALES OK

800-622-5557

(818)225-9327 FAX (818)225-8627

Woodland Hills, CA 91364

CIRCLE 540 ON READER SERVICE CARD

LOW & HIGH END CUSTOM SETUPS

CASH FOR MACS

FAX 310-317-1583

**BUY • SELL • TRADE** 

Open Monday-Saturday 22775 PCH, Malibu, CA 90265

CIRCLE 428 ON READER SERVICE CARD

Monitor

\$ 96

\$ 92

\$ 859

\$129

\$ 49

Radius Percision 17"... \$ 99

HP Deskwriter 540 ...... \$ 299

# DVANCED

800 . 847. 4622 FAX: (310) 314-7512

520C 8/160 .......\$2659 16/500/AV/cd 3359 16/1g.AV/cd 4159 HP Dekwriter 560c ...... 540C 4/320 ......\$3529 8100/110MHz

Power Mac

16/500cd ...... 1949 16/500cd .... 2489 Sony 17SE1 Multi....... \$ 96 7100/66 7100/80 Apple 17" Multi ...... 24/500 ........ 2649 16/700 ....... 2889 ViewSonic 17, 17".....

16/500 AV/cd 2799 16/700 AV... 3379 LaserWriter 320... 8100/80 8100/100 LaserWriter 360.....

40/1g/cd ...... 4579 40/1g/cd..... 4849 StyleWriter II w/Cable...... \$ 289

CIRCLE 470 ON READER SERVICE CARD

# TEL: (310) 314-7372

40/1gb/cd ..... 3449 24/700cd ... 3449 Printer

540C 12/320/M ...... \$4329 16/2GB/CD ......\$5599 Call for items not listed 150 4/120 ..... \$1349 40/2GB/CD .....





# **Computer Design** & Graphic Systems™

YOU!

CDG CUSTOMERS.

FREE SHIPPING!... call for details



CALL FOR UPDATED PRICING – NEW MACS ARE IN !!! CUSTOM CONFIGS AVAILABLE 6100/66 PowerMac 8/350 . \$1670 6100/66 PowerMac 8/350 CD \$1880 7100/80 PowerMac 8/700 . \$2688 7100/80 PowerMac 8/700 CD . \$2988 7100/80 PowerMac 8/500 \$2668 7100/80 PowerMac 8/700 CD \$2968 7100/80AV Pwr 16/700 CD \$3487 8100/100 PowerMac 8/700 \$3299 8100/100 Pwr 16/1 gig CD \$4059 8100/100 AV Pwr 16/1 gig CD \$4259

CAPTIVA® LINE

E-SERIES 486DX/33 8 MEG/ 540Hard drive SVGA/DOS/WIN/14" Monitor.....\$1399 C-SERIES 486DX2/66 8 MEG/ 540Hard drive SVGA/DOS/WIN/14" Monitor....\$1500

C-SERIES 488DX4/100 8 MEG/540 Hard drive SVGA/DOS/WIN/14" Monitor.....\$1889

M-SERIES
Pentium 90 8 Meg/340 Hard drive
SVGA/DOS/WIN/15" Monitor ... \$2300

CALL FOR CUSTOM CONFIGS AND QUOTES ALL PC SYSTEMS INCLUDE 2 YEAR WARRANTY!

#### **MONITORS**

Specialists in



Radius Precision Color 17"	¢030
nauma r revision color 17	
Radius 20GS Two Page Mono	\$829
Radius Intellicolor 20ES	1799
SuperMac 20" Color Plus \$	1329
SuperMac 21T XL\$	
SuperMac Pressview 21IN \$	
SuperMac 17XL 17" 28MM	
ColorPivot Portait Display	
NEC XP17 MONITOR \$	1279
NEC XP21 MONITOR \$2	
Apple 15" MULTISCAN	
Apple 17" MULTISCAN	
Magnavox 2080 14" Color	
VIEWSONIC 17G	
Sony 17 SE1/P	
Sony 15" st	\$449
Sony 20SE1\$	
RasterOps 20/20 Color \$	1599
RasterOps 20" Trinitron (	
Mitsubishi Diamond 17FS 17"	\$959
Mitsubishi Diamond 21T 21"\$3	
CTX 1765 GM Energy 17"	
Many More Available, Just Call	

#### OUTPUT

SuperMac Proof Positive dve-sub \$629
GCC Selectpress 600 \$3659
GCC Selectpress 1200 \$5756
Nikon CoolPrint 4x5 dyesub . \$1599
Xante 8200 Series CALI
Apple Select 360 \$1399
NewGen Imager Plus Series CALI
HP 4mv Printer CALI
HP Laserjet 4ml \$1025
LaserWriter 16/600 PS \$2249
QMS 1660 Print System \$3999
HP 560c \$599
NEC 640
SummaColor 11x17 AdobePS. CALI

#### SOFTWARE

#### **VIDEO**

**Configurations** 

Sanyo GVR-S950 edit deck . .\$1985 Radius Precision Color 24xp . \$249 Radius Precision Color 24xk . \$699 Radius Precision Color Pro 24x . \$389 Radius Precision Color 24xk Radius Precision Color Po 24x Radius VideoVision Studio 2 VideoVision Studio Pro Pak 2.0 Radius Thunder 24/GT SuperMac Thunder IV 1152 SuperMac Thunder IV 1360 SuperMac Thunder IV 1600 SuperMac Thunder IV 1600 99 GXE64 PRO 2 MEG PCI #99 GXE64 PRO 2 MEG PCI TARGA 2000 Digital Video (PC) . . MANY MORE...CALL

#### IMAGING



Sharp JX-610 11 x 17 \$8799
Agfa Arcus II color \$2599
HP Scanjet IICX\$969
UMAX PowerLook 2400 \$2899
Nikon ScanTouch 1200 dpi \$1149
Nikon CoolScan 2700 dpi \$1699
Microtek Scanmaker III \$2479
PixelCraft Scanners CALL
MANY MORE COMMITTED LILL

FREE Color Catalo Order Toda

#### STORAGE/MISC PINNACLE AND

OIUIL	
1.3 Gig Optical Media	\$79
230 Optical Media	\$29
128 Optical Media Special	\$21
Recordable 74 Minute CD-R	\$14
Micropolis HD 2217 AV	\$989
New Pinnacle CD-R Recorder\$	1799
Pinnacle Tahoe 230 Optical (19ms)	\$899
Pinnacle Sierra 1.3 gig (19ms)	2379
Seagate Baracuda II 2.4 gig\$	1179

Ouantum 1 gig. int. \$569
Ouantum 2100 2 gig \$959
Ouantum 5408 \$279
PWS Sledgehammer Wide Array CALL
Fijitsu 1.2 gig. \$579
Apple Style Ext. Keyboard \$59
Syquest Drives&Media CALL
Memory Upgrade Chips & vram CALL
MUCH MUCH MORE !!!

LOWEST Prices on GRAPHIC Software! OVER 22,000 products for the serious... GRAPHIC User!

PowerLook 2400dpl. . . \$2899 UC630 color 600dpi. . . . \$599 UC1260 color 4800dpi. . . \$995 







LEASING REQUEST A QUOTE TODAY

Leasing available to approved credit; \$2000 minimum lease amount. One day approval; one page short form application. Lease based on 36 month, \$1.00 Buyout. No min. time in business. 48 month leases available.



#### DIGITAL VIDEO & MEDIA CENTER

#### Digital Video

Professional/ Studio Video System 8100/100 PowerMac 40/700 HD

FWB 2gig WideArray w/JH scsi card Extended Keyboard SuperMac 17T 17\* Monitor Radius VideoVision Studio 2.0 Complete system . . . . . . \$11,699 Design your custom package today!

o Solutions	
Nec 4XE CD ROM	\$499
Apple 300 I CD ROM	
Apple CD Multimedia Kit .	\$479
Apple Design Speakers II .	\$95
Macromedia Software	Call
Adobe Auditions	\$169
Radius VideoVision Studio	2 \$3299
SuperMac Digital Film	\$3249
Micropolis 3 6 aig AV Drive	0.000

# Long Life Cartridges

44 MB ....\$38 88 MB ....\$44



100% Syquest Compatible.

Manufactured and sold under license from SyQuest. SyQuest is a trademark of SyQuest Technology Inc. Pre-formatted with 5 year warranty

#### NOW SUPPORTING IBM/PC PRODUCTS

MM/3d Software
StrataVision 3d \$495
Visual Reality \$399
Playmation\$339
Razor - Video Editing .\$129
Adobe Premiere \$195
Image-Q\$275
Call for Complete Desktop
Video, MultiMedia and
<b>Animation Systems</b>

#### WE GET IT RIGHT THE FIRST TIME!

The CDG Service Commitment

▼ Toll Free Customer Service Line

▼ Highly Trained Sales Personnel

▼ Factory-Fresh Products with

▼ Manufacturer's & CDG Warranty

▼ Lowest Price Commitment

Manufacturer's & CDG Warranty Lowest Price Commitment 
'OGG Systems warrants that all products will perform satisfactionly or we will rereplace (at our option) during the first 30 days after delivery. (This is in addition 
regular amunifacturers warranty). All customers smost call our Customer S
Department and obtain a Return Merchandise Authorization number (RAAA) before 
to gray ytems. All returned items are subject to a 20'r, restocking the, respection and 
be returned in "new" conditions with all original packing including any instructions, 
acts discount. All prices subject to Change, 825 charge an all cancelled orders, COC 
refused without cancellation prior to shipping will be billed full shipping charges.



Computer Design & Graphic Systems 6225 Presidential Court . Suite F Fort Myers, Florida 33919

800-741-622

Fax: 813-489-4694



Local: 813-489-4338 • Support: 800-741-6221 •



D	5,87	OHADDA		UNIVERSITY, LA'S LEA	DING COMPUTER ST	OREI	0	Annala Dalastana	Aunta Manitana
PowerMAC		QUADRA		GOVERMENT, AND FORTUNE				Apple Printers	Apple Monitors
6100/60 8/250	\$1299	605 4/160	\$749	1000 P.O.'S.		210		Select 310 w/Toner \$599	
6100/60 8/250/CD 6100/60 16/500/CD	\$1499 \$1899	610 8/230 610 8/230/CD	\$1249 \$1449	Trained Staff,				LASER 320 w/Toner \$899 Select 360 w/Toner \$1299	
6100/60AV 8/250/CD	\$1899	610 8/230/DOS	\$1449	We ship out of U.S.!	Decrees Co.			Pro 630 w/Toner \$1799	
6100/66 8/350/CD	\$1849	630 4/240	\$1029		A.E. H.			Pro 810 w/Toner \$4299	
6100/66 16/350/WIN	\$1899	630 8/240/CD	\$1499	(200) 6	B9-39	2 2 OR	DERS	Portable StyleWriter \$349	
6100/66 16/500/DOS	\$2599	650 8/230	\$2599				454	StyleWriter II Refurb \$229	
7100/66 8/250/CD	\$2199	800 8/230	\$2499	(310) 473-25	35 FAX (3	110) 312-9	7041	Color StyleWriter PRO \$599	
7100/66 16/500/CD 7100/66 40/TGIG/CD	\$2549 \$3449	840AV 8/500 950 8/0	CALL \$2799	SAME PRICE FOR	CASH OR	CREDII CA	RDS.	Color StyleWriter 2400 \$499	XP15 15" Color \$599 XE17 17" Color \$949
7100/66AV16/500/CD	\$2799	950 8/500	\$3099	DOWNER HEAD				Hewlett Packard	XP17 17" 1280X1024 \$124
7100/80 8/500	\$2599	950 16/1GIG/CD	\$3999		E GBa	dra 6	<i>U5</i>	DeskWriter 540 \$299	
7100/8 <u>0</u> 8/700/CD	\$2899	POWERBOO	W	The state of the s	Includes	5700 of FREE Softwar	rol	DeskWriter 560c \$479	
7100/80 16/700/CD	\$3399			4/320HD 532	68040 25MF	tz, PowerPC Upgrade		DeskWriter 320 \$319	
8100/80 8/0 8100/80 8/500	\$2499 \$2699	150 4/120 165'S & 180'S	\$1299 CALL	ACTIVE MATRIX COLO	OR!	COUD CT	7/10	DeskWriter 320/SHEET \$379 DeskJet 1200c (PS) \$1899	
8100/80 16/500/CD	\$2999	520 4/160	\$1999	12/320 Village 14.4 FAX \$3	999	ALID 37	Service A	LaserJet 4ML \$989	
8100/80 16/1GIG/CD	\$3349	520C 4/160	\$2549	Darfarma's	omes with \$75	O of free soft	ward	LaserJet 4MP \$1199	
8100/80 40/16/G/CD	\$4199	520C 8/160	\$2749	Performs 475 Pe	eforme 550	Performa	575	LaserJet 4M \$1599	
8100/80 72/2GIG/CD	\$5499	540 4/240	CALL	68040 25MHz, Keyhourd and 680. Monitor sold separatly, FAX Mor	20 33MHz, Keybeerd and elter included! SEND FAX	68040 66/33MHz, Key Monitor included! SEI	boord and	LaserJet 4M Plus \$1849	
8100/80 136/2GIG/CD 8100/80AV 16/500/CD	\$6999 \$3399	540 12/240/EXP 540 12/320/EXP	\$3499 \$3795	4/250 \$799 5/1	60/CD \$1199	5/250/CD \$	1599	LaserJet 4MV \$2749 Scaniet IIcx \$929	
8100/80AV 72/2GIG/CD	355999	540C 4/320	\$3299	Performs 630 Pe	rforma 6110	Performa (	6115	220 Volt Products CALI	
8100/80AV 136/2GIG/CD	\$7699	540C 12/320/FAX	\$3999	68040 66/33MHz. Keyboard and RJS. Mantter included! SEND FAX. 15" M	C 60MHZ, Keyboard and lonitar included! 14.4 FAX.	RISC 60MHZ, Keyboo	ard and 14.4 FAX.		SuperMac
8100/100 8/0	\$3149	540C 12/500/FAX	\$4399	8/250/CD \$1749 8/	250/CD 52399	8/350/CD \$	2499	HARD DRIVES	Thunder II GX 1152 \$164
8100/100 8/700	\$3249	540C 20/500/FAX	\$4699	DADELLE		2 PLI		Quantum 160MB \$129	
8100/100 16/1GIG/CD	\$4099	DUO		FADIUS				Quantum 250MB \$199	
8100/100AV 16/1GIG/CD 8100/100 40/1GIG/CD	\$4249 \$5099	250 4/200	\$1599	Precision Color Pivot 15"		5 EXTERNAL	\$579 \$429	Quantum 500MB \$279 Quantum 1GIG \$569	
8100/100 72/2GIG/CD	\$6099	250 12/200/EXPRESS	\$2249	Precision Color Display 17" IntelliColor Display 20e 20"	\$1099 88/44RW \$1849 270MB 3.5	5.25 EXTERNAL	5429 5499	Quantum 2GIG \$109	
8100/100 136/2GIG/CD	\$7899	270C 4/240	\$1995	Precision Color Display 21"	S1995 105MB 3.5		5359	APPLE 700MB INT \$349	
8100/100AV 136/2GIG/CD		270C 12/240/FAX	52599	VideoVision Studio		Array F-REM	\$1599	Barracuda 2.4 GIG \$1199	
8100/110 16/2GIG/CD	\$5599	280 4/240	\$2389	VideoVision Studio ProPak		Array F-REM	\$4299	FWB Hammerhead CAL	
WORKGROUP SERVERS	CALL	280C 4/320 280C 12/320/Modem	\$2999	PrecisionColor Pro 24x Interface		gneto Optical	\$2399	Micropolis 9GIG 8ms \$349	
SOFTWARE		Mini Dock	\$299				CONTRACTOR OF THE PARTY OF THE	SCANNERS	20" Hires Trinitron \$237" 21" Two Page Color \$167"
Adobe PhotoShop 3.0	\$539	Duo Dock 230HD	\$649	GE 4 YEAR	UNSHE	Warhan	INA	Apple Color One \$699	
Adobe Illustrator 5.5	\$369	Duo Dock II	\$899	To find out how much, loca	le the product's va	we on the table be	eldw:	Agra Arcus Plus \$2699	
Aldus PageMaker	\$595	External 1.44 Floppy	\$149	\$100 to \$350 \$351 to \$350 \$701	to \$1200 \$1201 to \$2000	\$2001 to \$3000 \$400	1 to \$5000	Microtek II \$639	
Quark Express PPC Microsoft Office PPC	\$649 \$459	210 & 230's CALL FOR NEW MC	CALL	\$49.95 \$79.95 \$1	39.95 \$169.95	\$199.95 \$2	259.95	Microtek IIG \$459 ScanMaker IIXE \$950	SAME DAY SHIPPIN
Control of the Contro				CONTRACTOR OF STREET		ALPENNEY PT			
We carry onl	y ne	w products. L	et u	s custom config	ure your s	ystem! W	e acc	ept VISA, Maste	rCard, and AMEX.
CIRCLE 497 ON READER SERVICE CARD									



#### Quadra's 8/230 650 2550 ~ CALL 840AV 8/230 605 695 4/80 630 8/230 1295 950 8/500 3295 950 16/500DAT 3850 Power Books

FO	Mel DOO	V9	
540C	4/320	3295	
540C	12/320M	3950	
540C	36/500M	5395	
540	12/240M	3795	
520C	4/160	2475	
520	4/160	1995	
180 Ref.*	4/80	2250	
280C	12/320M	3850	
150	8/120M	1900	
150	414.00	ADEE	

150 4/120 1355 10837 SANTA MONICA BLVD. LOS ANGELES, CA 90025 Tel: (310) 470-7099 Fax: (310) 470-8099

Work Group Server 95 16/500DAT 3895 80 16/500DAT 4595 6150 16/500CD 2750 Upgrade 95 to 9150 2195 **AppleShare** 995

Apple **Apple Monitor** 15" Hi-Res. 485 ≈ 14" Color Plus 320 17" Color 965 ≈ 14"AV/20" 579/1950

2GB DAT

695

8100/100

8100/110

8100/100AV

**Apple Printer** 950/1850 320/630 16/600 2250 1195/4395 360/810 Scanners

AGFA Studio Scan II AGFA Horizon 16900 AGFA Arcus Plus II 2650 AGFA ProColor Premier CALL Deskwriter 540/320 Umax Color Look 2879 PixleCraft (Xerox) 4000 PixleCraft (Xerox) 8000 9995

#### Call for New Generation of **POWERMAC**'s Custom Config. POWER MAC'S 8/0 8/500 16/1<sup>GB</sup> 24/1<sup>GB</sup> 40/2.0<sup>GB</sup> 72/2.4<sup>GB</sup> 136/4.0 Available 6100/60 1195 1395 1995 2295 3145 4095 N/A 6100/60AV 1645 1865 2465 2765 3645 4545 N/A 6100/66 1799 N/A 1576 2399 2699 3576 4476 7100/66 1950 2180 2780 3080 3950 4850 7650 7100/66AV 2150 2380 2980 3296 4150 5050 7850 7100/80AV 3775 8650 2950 3175 4075 4950 5850 7100/80 8220 2525 2745 4520 5420 3345 3645 8100/80 2395 2595 3195 3495 4395 5495 8095 8100/80AV 2695 2930 3530 3830 4700 5595 8395

Printers & H.P.'s Laser 4M/4M+ 1595/1899 Laser 4ML/4MP 969/1299 Laser SiMX 4240 295/315 Deskwr. 560C/310C 495/335 2150 ~ HP 4MV 2695 ScanJet IICX 850

DeskJet 1200 PS 1895 GCC, Xante & QMS CALL

APPLE CD 300I PLUS ADD \$300. SOFTWINDOW ADD \$150. 1MB V-RAM ADD \$75. SPECIAL.. 8100/100 8/700 CD

3920

4020

5325

4220

4320

5625

4999

5199

6499

3230

3420

4795

2995

3195

4495

\$3450. Audio Video

Thunder/24 699 Thunder IIGX 1360 1595 Radius Video Vision Pro 7995 Radius Video Vision 2.0 3195 Phillips CD ROM Rordr. CALL Demo MAC's

5400

6100

7395

8695

8900

10195

8/500 950 2995 840/800 8/230 2395 LCII 4/80 395 PB 520/520C 4/160 1895/2150 MAC IISi/Ci 3/40

Exchange any old MAC to NEW **POWER MAC** 

Adult CD's

Call for APPLE 3rd party products · Intern Visa, MC & AmEx Welcome - Next Day Shipping for U.S.A. & International

CIRCLE 453 ON READER SERVICE CARD

## LATEST



## SPECIALS

#### USED SYSTEM SPECIALS



68030 33MHz Factory Refurb

8999.00

Refurbished Printers
Stylewriter - \$149.00
Stylewriter II- \$189.00



Refurbished Printers LaserSelect 300-\$349.00 LaserSelect 310-\$369.00



Mac LC II 4/120 W/Kbd & New Apple 12" Mono. Monitor

≥ \$649.00 **■** 

COLOR CLASSIC 4/80 KEYBOARD & MOUSE

> \$775.00

#### SUPER DEALS ON USED

**Performa 466 4/160 \$599. (68030 33MHz Factory Refurb. W/ClarisWorks & Mouse On **Mac LC II 4/80 w/kyb \$479. Mac Quadra 950 8/0 \$2,175. PB 145B 4/80 \$849. PB 180C 4/80 \$1,999. Duo 210 4/80 \$599.	ImageWriter II   \$199.00
---	---------------------------

Save \$200.00(or more) on New Power Mac 7100 & 8100's

With The Trade-In Of Any Mac CPU (working or not) Huge trade-in allowances for all Mac Equipment (Call for details, limited time promotion)

#### New Apple

8•24 Video Card \$129.00

Toner for LW Select 300/310 \$69.00

New MS Word/Excel Bundle-\$79.00
ONLY \$4900 With Any CPU

#### BOTH FOR ONLY-8159.00

New NEC CD Drive - \$99.00 Includes Over \$200 Software Free:

T/Maker Clickart 2000 & DRIVE 7 CD & The Merchant
• New Microsoft Works-\$19.00



\$129.00

New Apple 12" Mono Monitor

Hewlett-Packard DeskWriter550C

Color Ink-Jet Printer (Factory Refurb) > \$299.00

New Apple LaserWriters LWLS-\$399.00 / LWSelect 310 - \$449.00

	THE RESIDENCE OF THE PARTY OF T	COLUMN TO SERVICE STATE OF THE	EURAS PEROLINA DE PRESENTA DE	SHOW A SERVICE OF THE PARTY OF	ē
	New Apple Color Plus Display	\$299.00	New Apple One Scanner	\$399.00	
	New ImageWriter II	\$325.00	New Ext. Hard Drive Enclosures	\$69.00	
K	New Apple HDI-20 Ext 1.4 Drive New Laser IIf Logic Bd (Upgrade)	\$149.00	New Extended Keyboards	\$75.00 \$25.00	4
Z	New Laser IIf Logic Bd (Upgrade)	\$349.00	New Mac IIci Cache Cards	\$25.00	3
	New Laser NTR Logic Bd (Upgrade)	\$299.00	New Adobe PhotoShop V2.5LE	\$69.00	4
	Mac Plus No Kbd/Mouse	\$159.00	Mac II 1/0	\$199.00	
鱼	Mac SE (800K) 1/0 Mac SE (FDHD) 1/0	\$225.00 \$325.00	Apple Hi-Res Mono Monitor		0
S	Mac Classic 2/40	\$429.00	Apple 12" RGB Display	\$179.00	-
5	Mac LC II 4/40	\$399.00	Apple 16" RGB Display	\$649.00	
Los	(Other Configurations Available)	The same	Apple 8 Bit Video Card	\$85.00	J

We Now Feature A Huge Inventory Of Parts For All Apple Products And Also Offer Extended Warranties On All Apple Equipment

Limited Quantities/Prices subject to change Prices represent a Discount - off Full Price Returns at discretion of Mgmt./15% Restocking fee 1-800-729-7031

1150 W. Alameda Dr., Ste.1&2, Tempe, AZ 85282 (602) 858-0900 /(602) 858-9537 (Parts)

WE WANT TO BUY YOUR NEW/USED MAC EQUIPMENT

CIRCLE 401 ON READER SERVICE CARD





uffal

6

FREEDOM

CREATIVE

the

xperience

#### DIGITAL VIDEO/PUBLISHING WORKSTATION SPECIALISTS

TRUE BROADCAST QUALITY · HIGH-8 · S-VHS · BETACAM

MACINTOSH SYSTEMS	7
Quadra 950 8/0	
Quadra 950 8/230	
Quadra 950 16/1G 3,555 7100/66 8/1G CD 2,725	-
Quadra 605 8/160	
Quadra 630 4/250	
Quadra 630 8/250 1,475 8100/80 AV 16/1G CD 3,650	
PBK 520 4/160	
PBK 520C 4/160	
PBK 520C 12/160/Modem 3,295 7100 AV/80 16/700/CD 3,425	
PBK 540C 4/320	
PBK 540C 12/320/Modem4,595 6100/80 8/350/CD	1

SOFTWARE BLOW OUT!!!!!!! obe PhotoShop 3.0.1

MONITORS

SCANNERS

CALL

880

915

1,700

1825

765 2,499

CALL

00

geMaker 5.0

rest Prices in Market

Optiquest 17" Trinitron

Radius Intellicolor 20e

SuperMac 17T

SuperMac 20T

MULTIMEDIA M	ASTERING
Media 100	CALL

Media 100	CALL	Add
Radius VideoVision Studio	2,875	Pag
RasterOps MoviePackPro	2,875	Illu
Radius Telecast	CALL	Lo

Telecast	CALL	L
		•
SUPERMAC		

e	the state of the s	
4	Thunder II GX 1600	
	Thunder II GX 1360	
å	Thunder IV GX 1600	
	Thunder 24	

PRIN

ERS	
	Name of Street
	5,450
	1.545
	A PROPERTY.

1.250

Kodak ColorEase Fargo Primera Pro LaserMaster PressMate 1800 CALL HP LJ 4MV 11" x 17" 3,250

AGFA StudioScan Microtek ScanMaker III **UMAX UC 1260 Pro** 3,250 PixelCraft Prolmager 8000

COMPLETE VIDEO WORKSTATIONS FOR AS LOW AS \$8,995

CIRCLE 405 ON READER SERVICE CARD



and Peripherals

Catalog

Of Used

While Mac outfits come and go, we just keep on doing what we do best. We've been refurbishing and selling used computers for 11 years. Your satisfaction is guaranteed with us!

1-800-SUN-0999 1-800-786-0999

Call Anytime!

PO Box 4059 Logan, UT 84323-4059 International (801) 755-3360 Fax: (801) 755-3311



CIRCLE 424 ON READER SERVICE CARD

## 1-800-334-KIWI

Quadra 605 4/160Call
Quadra 630 8/250 CD\$1499
Performa 6115 8/350 CDCall
PowerMac 6100/60 & 6100/66Call
PowerMac 7100/66 & 7100/80Call
Powerbook 150 4/120\$1365
Powerbook 520, 520c, 540cCall
Duo 270c & 280cCall
All products listed above are new with a 1 year warranty.

#### **Used & Refurbished Macs**

COCK TO RECEED WHITE	1222
LC    & LC	Call
LC 475 4/160 w/14" Color	\$899
Performa 400, 450 & 460	Call
Centris 650 8/250	\$1499
Powerbook 160,165, 180, 180c.	Call
Stylewriter II	\$199

Used & Refurbished products have a 90 day warranty.

#### We buy New & Used Macs

Visa & Mastercard No Surcharge. Better Business Bureau Member.

Kiwi Computers, PO Box 67381, L.A., CA 90067 Toll Free (800) 334-5494 Fax (310) 286-9667 In California and Overseas (310) 553-4507 Hours: Mon-Fri 8am-5pm PST

Returns are subject to a 15% restocking fei oject to change without notice. Quantities ma Not affiliated with Kiwi Software, Inc.

CIRCLE 404 ON READER SERVICE CARD

# omputers Apple radius

Onitors Apple NANAO NEC NOKIA radius SONY Printers Apple EPSON LEXMARK

ANIMATION

VIEDIA 100 3-D DVE Alladin Adult

ElectricImage • ELECTROGIG • form-Z • TOPAS • VIDI Animation Stand • SCULPT • SHADE • AIMTECH

**GFA PixelCraft YARC NO** 

You won't find anyone with more Macintosh expertise than the experienced consultants at PowerMax™. Give us a call today for a competitive quote and expert advice. Make our knowledge your power!

#### Mac CPU's & Powerbooks Lasers, Printers & Scanners

Quadra 605 4/80\$549
Quadra 605 4/250\$789
PowerMac 6100/66 8 mb ram\$1487
PowerMac 7100/80 8 mb ram\$2485
PowerMac 8100/100 8 mb ram\$2989
Quadra 630 4 mb ram/250 drive.\$1086
PowerBk 150,520,520c,540c -in stock!

Call for pricing on all recently discontinued PowerMacs!

Have your Mac your way! Call for custom configuration quotes.

#### RasterOps 21" Grayscale Monitor. \$646

RasterOps Clearvue 20T Monitor. \$1829 NEC Multisync XP 21" Monitor...\$2496 New! Apple Personal Laser 300...\$629 Texas Instrum, MicroWriter PS23, \$635 NEC Superscript Model 640 Laser. \$718 Apple LaserWriter Select 360...\$1479 Xante 11x17 Laser- Auth. Dealer...\$Call Enson 1200C Scanner...

New! Umax Gemini Scanner 1600.\$Call This is just a small sample of the millions of dollars in inventory we have in stock!

#### Software & Drives

We'll match any software price in this mag-	azinel
Adobe Illustrator 5.5 w/CD Rom	
Adobe Photoshop 3.0 Software	
Sony CD Rom Drive w/Groliers	\$279
External Syquest 200 w/cartridge	\$529
Wacom ArtPad w/Dabbler	\$189
PowerMax Ext. 250 Meg. Drive	\$249
PowerMax Ext. 500 Meg. Drive	\$329
PowerMax Ext. One Gig Drive	\$629
PowerMay Array Honrades	Call

We specialize in hi-performance drives and accessories, and also hard-to-get items!

#### The PowerMax Difference

We've been designing complete Macintosh systems since 1987. Most of us at PowerMax have used Macs personally since well before that. What this means is that we don't just sell you a box and hope you never call back.

We'll give you some advice, customize and bench-test your system, and support you before, during and after the sale. Call us today to experience the PowerMax™ difference.



800-844-3599 24 hour fax line:

\$1,995 or \$75/mo.\*

system you desire

1-503-232-7101

(West Coast- but we're not in California!) Available terms include:

A Quadra 630 System Like Never Before!

This customized system includes a 500 megabyte hard drive, 12 megs of ram, extended keyboard, 14" color monitor, surge protector and our PowerGames™ software

package. Call us today for this or any Mac

COD, Visa, MasterCard, American Express and Company PO's Ask about our fantastic business leasing programs!

CIRCLE 446 ON READER SERVICE CARD

New Powerma	cs	Apple Mon	itors	Hewlett Pack	ard	
	675	Color Plus 14"		Deskwriter 320sf	385	Call for items not listed
	2475	14" AV Monitor Apple 15" Color	589 489	Deskwriter 540	299	NewGen
	199	Multiplescan 17"	200	Deskwriter 560C Laser 4ML	489 969	Radius
8100/100 32/1G/cd 4	795	Multiplescan 20"	1899	Laser 4MP	1319	RasterOps
	Call	Apple Prin	ters	Laserjet 4MPlus	1869	Sony
Quadras		Stylewriter II	285	Deskjet 1200C P/S Laseriet 4MV	1569 2725	PLI
750		Stlyewriter clr 240 Port. Stylewriter	00 499 389	Laser 4Si Mx	4079	Umax/Microtek
Control of the Contro	11000	Laser Select 320 Laser Select 360	865 1425	Scanjet IIP Scanjet 3P w/ocr	449 525	Mac Storm
950 256/2GB/CD 12	895	Laser Pro 16/600	2195	Scanjet IICx w/ocr	925	Call (310)829-9780
Powerbooks/Du	os	Laser Select 810	Call	Superma	c	Free inquiry by fax at
Contract of the Contract of th	2255 2799		575/679	Supermatch 17x1 Supermatch 21 Col		1-800-fax-9553

3299 SW 640 745 Thunder II GX 1152 Call CIRCLE 440 ON READER SERVICE CARD

1995/2475 Supermatch 21Txl

Thunder IIGx 1600

Supermatch 17T

Call

XE/XP 17"

XE/XP 213

3V/3FGE

825

Call

Local & Int'l fax (310)315-1009

Prices shown are for C.O.D only and may change w/o notice

1925 Int'l Sales Welcome

PB 520C 8/160 PB 540C 4/320

Duo 280c 4/320

PB 540C 12/320/M Call

PB 540C 12/500/M 4595



**PowerMacs** 8100 110-72/2.GB \$7690 136-2GB5 7990 8100 AV 24-1GB-C 8100 40-1GB 4980 8100 8-0 CALL 7100 40-1GB 3750 7100 24-700-CD CALL 7100 66-8-500 1990

7100 8-0 CALL 6100 16-500-D 2090 6100 8-500 CALL 6100 8-0 CALL Powerbooks 540c 20-540 540c 12-320 540c 36-540 \$4175 3390 CALL 2550 3099 CALL 520C 4 - 320 520c 20-340

520c 8-160 Demo Powerbooks 180C 8-160 145-170-160 CALL 140 4-40 Duo 280c Duo 270

Upgrades Quadr 840 to 8100/100 1790

Ouadr 800 to 8100/80 1375 Mac II Ci to 7100 Q/Ctrs 660AV to 7100 CALL Ouadr 950 to 9150 CALL Quadr 950 to 8100-110 CALL PB 180 to 520c Ouadr 610 to 6100/60 725 PowerBook Upgrade CALL Si-LCII-Q700 to Power PC CALL

Call for DEMO units & Upgrades

**Printers** 

Select 360 DeskWriter 560c 585 DeskWriter 1200c HP Lase 4M Plus 1895 HP Laser 4MV CALL HP Laser 4MP

Other Printers availabl NewGen - QMS Scanners

Hellett Packard - AGFA Microtek Umax

Hi-End

Power Mac 8100 /110 136M RAM - 2GB HD - CD 20" Monitor Tri. \$116 \$11690

Power Mac 8100/100 72M RAM - 1GB HD -CP 20" Monitor 20" Monitor Ext Keyboard Mouse Pad

Power Mac 7100/80 40M RAM - 1GB HD - CD 17" Monitor \$4899 Extended Keyboard

Call

2845

1069

899

Mac Performa

Ouadra

Q630 4-250 Q630 8-250 Q605 4-160 w/soft

Per 475 Per 630cd

Per 6118

Per 6110

Q605 8-160 Q610 8-250 Q950 8-0

VideoC

ard Video Vision Studio SCALL Prec. Color Pro 24X 980 Thunder II GX 1600 CALL

We Pay Top \$\$\$ For Your Mac TRADE YOUR MAC

FOR NEW ONE

TEL: 310-441-4771 Fax: 310-441-4770 10922 Pico Blvd. Los Angeles, CA 90064 CIRCLE 432 ON READER SERVICE CARD

PLEASE ASK FOR LATEST LOW PRICES THANK YOU FOR YOUR BUSINESS INTERNATIONAL ORDERS VISA-MC-AMEX-COD OK

Tel: (818) 505-8991 Fax: (818) 505-8992 POWER MAC

16-1G CD 3999 3249 8-700

7100/80 16-700 CD 3179

6100/66 16-350 CD 2149 8-350 1679

8100/100 AV 16-1G CD 4249 8100/80AV 100/66AV 100/66 16-500 CD 3399 8100/80 16-500 CD 2349 / 2999 8-0 / 16-500 CD 1899 / 2599 7100/66 Call

7100/80 AV 12-320 16-700 CD 3439 Call

> 6100AV/66DOS 16-500CD 2499 8-250 AV 2069

16-2G CD 5549

144-2G CD 8929.

16-0

CALL FOR ANY CUSTOM CONFIGURATIONS

Powerbook

4-320 540c 12-320 3799 20-500 540c 4229 520c 8-160 2889 3199 520 8-160 12-320 2679 150 4-120 1389 Duo 280c 4/320 Duo 280/270c G.V. Mercury FAX 315 4MB RAM 8MB RAM 329 16MB RAM 599

HARD DRIVES Quantom 2.1g Quantom 1g Quantom 540 Quantom 350 32MB RAM Call Call for lowest prices Quantom 170 160mb f/PB

Nec 3v 15" Nec xe15 Nec xp17 Nec xe17 Call 959 595 279 SUPERMAC Sup 17T Sup 21TXL Thunder Hgx 1360 24xk

Monitor

Apple 14" PLUS Apple 14Trin Apple 15" Apple 17 Multi Apple 20T Multi SONY 959 1899 SONY Sony 17Se1 Sony 17sf Sony 15sf Sony 20SE RADIUS Rad prec 21\* flat Rad 20e 20\* Rad color pivut NEC HP HP
HP 4ML
HP 4MP
HP 4MP
HP 4MV
HP D1 1200C PS
HP Deskwriter 560c
HP Deskwriter 540
HP D.W 320 NEC 469 569 1229 Scanners

Microtek 35T Microtek Ilhr Microtek iisp Umax UC840 UmaxUC 1200SE 959 999 769 669 2486 2597 AGFA Arcus II

Printer

Dealers & International Sales Welcome!

800-345-1234 (310) 398-3300 TEL: (310) 391-2488

3847 Grand View Blvd. Los Angeles, CA 90066 Dealers & consultants call for best current prices! We will meet or beat your best prices! Next & same day shipping available! Visa & Mastercard accepted.

-All prices are 5%+cost "Verified!
-No sales tax for outside of California orders. "Prices subject to change without notice!"

PowerMac 6100/66 8/350CD

7100/80 8/500 2595. 8/700CD 32/700CD 32/2Gig CD AV16/500CD 3452.

8100/100 8/700 3279 16/1Gig/CD 3995 40/2Gig/CD 72/4Gig/CD 7199 AV16/1Gg/CD 4275.

605 4/160 795. 649 605 8/160 945 1849. In Stock! 2499. 610 8/160 1275 AV 8/250CD CALL 610 8/160Dos CALL 650 8/230 800 8/230CD CALL CALL 840AV 8/230 CALL

2895. 950 8/230 2995 3695. 950 72/1Gig/CD 5480. 4395. 950 136/4Gg/CD 9280. Specials Select 310 Quantum 230Int. 545. Quantum 230Ext. 199. External HD case 39

Gcc Portab. printer 179. AV16/1Gg/CD 4275 AV40/2Gg/CD 5675 21" Grayscale 545 110/16/2GgCDCALL 20"T Trint. Color 1595

PowerBook's 145B/165 CALL 180/180c CALL 1365. 520 4/160 2077 540 4/240 CALL 540 12/240M 540c 4/320 CALL 540c 12/320M CALL Duo 230 4/80 1195. **BO Mini Dock** 

Duo 280/280c CALL Duo Dock II 895, NewGen Imager Plus 6 CALL Imager Plus 6L CALL Imager Plus 12 CALL EPSON

ES-800C Pro 1195. 545. Actionscanning CALL Sudio Scan I 1595. Sony 2036-S \$ 1595. Arcus Plus II CIRCLE 464 ON READER SERVICE CARD

PRINTERS UMAX StyleWriter I StyleWriter II 189. 285. StyleWriter color Portable Styl. 589 Pro 630 1849 Pro 810 CALL Laser LS 395 Select 310 Select 360 1429. DeskWriter 560c D.Writer 1200c CALL

HP Laser 4MPlus 1885. HP 4ML 845 Select Press 600 3685. Select Press 600P 4775 Select press 1200 5895. WideWriter 360 1429.

Sudio Scan II

RADIUS RasterOps UC630LE UC840 Kais UC1260 Full p. PowerLook(New)
MICROTE ScanMaker II ScanMaker IIHR 987.

ScanMaker IIG 2297 ScanMaker III 17T Trinitron 20TXL Color 21TXL Color

Pressview 21\* Thunder/24 Thunder IIgx1152 1095. Thunder II ox 1360 1385. Thunder Ilax1600 2295.

Thunder Ilax1600 2295.

256 Most Optical 1895.

2.4 Berrecuda Int. 1395.

2 Gig DAT drive 895. 985.

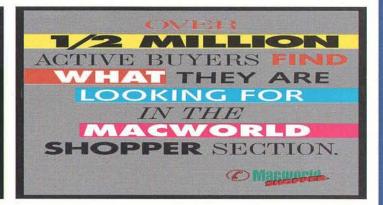
939. Please call for best prices 1369. 575. Precision 17" 835. Intelecolor 20v 1045. Precision 21 1945 Pivot Display Full Page GS TPD 20GS Two Page 21GS E-Machine 16"

Primera Color Primera Pro Color 845 1895. 88MB 88/44MB 945. 200mb 270mb 128MB Ontical

3FGE 37 639. 469 4FGF 725 5FGE 1095. 969. 5FGP 1225 6FGP 699. 2395 3PG 799. 1345. 2412 765 2412T 4816 3595 965 279. 4816T 9624T 1895 445 Softwar 495 PageMaker 5.0 477 899. FreeHand 4.0 317 397 WordPerfect 99

Macworld Shopper offers a great way to reach 575,000 active shoppers.







L	0	W	E	S	T		P	R	1	C	E	S	G	U	A	R	A	N	T	E	E	D
Po	wer M	lacin	tosh (	CPU	8	I	Blow	Ou	t Mo	dels			Mon	itor	. 8					SCANN		
		_					STATE OF THE PARTY.				-			* F V I			UMA	X UC6	30LE w	v/PHOTO	SHOP L	
	66 8/350		Thurst	7	1619	Quad					\$659	1000000	4" Plus			\$289	U-MA	X UC	840W/F	PHOTOSE	IOP	\$929
	66 16/50		<b>SNEW</b>		2195	Quad Includes C				Full Co	\$699	100000000000000000000000000000000000000	4" Color T	rinitro	n	\$399	U-MA	X Po	werLoc	ok Cole	or	\$2859
	66 8/35		and/or.		1849	Duo, Comi	mon Grou	nd, Work				Apple 1				\$549		_	60 PR		-	\$1129
	66 AV 10		CD	100	2299	American I		CHARLES AND	/220		1000		5" M-Scan			\$495				M	WP.	,
	80 8/500		220		2589	Quad	100	100			1099	Type A	7" M-Scan			\$985			8c Ext			\$389
	80 8/700		ZAIEN		2869	PB 18	- 40		-	4	1959		0" M-Scan		ar	\$1919		iest 2	00 MB	Ext		\$545
7100/8	80 40/10	GB/CD	ZHAN		5069	PB 18	-		ref		2059	200	1" Color	Ref T		\$1199	Syqu	iest 2	70 MB	Ext		\$549
	80 av 16	a and distance of	D			Apple	e 21"	Col	or .	Ref \$	1199	T 20 2 2 2 3 3 3	7-SE1/P			\$999	1		Prin	ters		
7235	80 16MI	75 50			2499	Porta	ble §	Style	Write	er	\$299					\$899	Perso	onal L	aserWr	iter 320		\$898
	100 8/70	The second			3289		Day	werB	an Iron			And the second	5-SEI COI		- Flo	\$469	Laser		The Control of the	360(10H		\$144
	100 16/7			\$	3979		PO	werbe	JOKS			SONY 2	The state of the s	1		\$1879	1		Writer			\$509
8100/	100 16/1	1000/C	D	\$	3989	PB 150	4/120				\$1389	SUPER	MAC 21TX	L 💯		\$1985			r 16/60			\$219
8100/	100AV 1	6/1GB	/CD	\$	4259	PB 150	8/120	/Mod	-	and a	\$1859	SUPER	MAC 17XL			\$859			riter 54	- 400	100	\$298
8100/	110 16/2	2GB/CI	D market	\$	5695	PB 520	4/160	)	A STATE OF THE PARTY OF THE PAR		\$1749	NEC XE	17 17" Co	lor		\$1039		-	riter 50			\$589
Q630	4/250			\$	1089	PB 520	8/160	/Mod			\$2489	The Contract of the Contract o	21 21" Co			\$1995	500000000000000000000000000000000000000			20 w/CS	F	\$389
Q630	8/250 /	CD		\$	1698	PB 520	c 4/1	60					21 21" Co			\$2459		Color I		10 11/00	-	\$598
Q630	20/250/	CD		\$	1998	PB 520	c 12/5	00/M	od	New	Pricing	Radius	IntelLiCol	or 20e		\$1819	1000000		t 4 M	Plus		\$198
Q650	8/230	F	70	C	ALL	PB 540	c 4/32	0			\$3459		J. Sandara				77.00	aserjet		1143		\$289
Q610	8/230	Ŀ	A STATE OF	C	ALL	PB 540	c 12/5	00/M	od		\$4395	Cust	om Co	nfig	ura	tion				la		VIA
Q950	16/500	100	111111111111111111111111111111111111111	\$	3385	Duo 28	80c 4/3	320		2	Call	-	iove	Lal	110				t Too		Fe	dEx
Q 950	264/1G	B/CD		\$	5940	Duo 28	30c 12/	320/N			Call	4		te de la			Ge	כונ ו	omo	rrow	7 (11)	eral Express
Q950	64/1GB	/CD		\$	5940	Duo D	ock II		400	The same	\$898		Mon-Fri 8	3:00 To	6.00	Since 10	)88 PRI	CES REFLECT	CASH DISCOU	INT & SUBJECT	TO CHANGE	W/O NOTICE
Q950	128/2GI	B/CD		\$	8920	DUO F	LOPPY	DRI	VE		\$149	Manual	SAT	10:00 To	02:00	PST	N.	1	- D	000	TM	CARDON LIPA
Al	PPLE WO	присти	MID SIN	RABINS		Global	Villag	e PP	Mercu	ry	\$349	V/SA*	1941 Fre Signal Hi	eman #	B 00804		11			ase		J.S.A
1000	5150 8/		2011 101		2985	Global	Villag	e PP	Gold	5	\$269	TO THE REAL PROPERTY OF	Fax (31			4		100000000	-VI2034 0	as MacExpr		
	3150 o/			17950		PB 500	Batte	ry			\$129	Times to Cont	In So. Calif	ornia (3	10)49	8-1230	O	(80	(0)	951	-12	230
AWS	170 10	)/1000/	Cu/DA1	/A3 \$	0195			TO .	C	RCLE 4	43 ON REA	DER SERVI	242000000000000000000000000000000000000					100		,,,		
									-													

# INTERNATIONAL COMPUTER & NETWORKING

# TRADE IN YOUR OLD MACFOR A NEW MAC

## WE CARRY: NEC . SUPERMAC . RADIUS . SONY

# TRADE-INS • UPGRADES • SYSTEMS • PARTS

## AT OUR PRICES

**UPGRADE OR TRADE YOUR** OLD MAC FOR A POWER **MACINTOSH** 

POWERINACS	
PPC 8100/110 16/2G/CD	\$5995
PPC 8100/110AV 16/2G/CD	\$6195
PPC 8100/100 AV	CALL
PPC 8100 72/2G/CD	\$5750
PPC 7100 24/500/CD	\$2780
PPC 7100 AV 16/700/CD	CALL
PPC 6100 8/250/CD	1495

DOWEDMACE

#### **POWERBOOKS**

540C 4/320	\$3375
and the same of th	10000
520C 36/500	\$3750
520 20/500	\$3005
520 20/500M	\$3305
150 4/120	\$1360
DUO 270C 4/240	\$1975
DUO280 4/240	\$2490
DUO280C 12/320/M	\$3590

Q	UA	DI	RA	S
 200763	-			

840AV 8/230 D	529/5
800 8/230 D	\$2495
650 8/230 D	\$2100
610 8/230/FPU	\$1150
660AV 8/230 D	\$1495

#### **MONITORS**

14" COLOR PLUS	\$289
17" APPLE COLOR	\$999
NEC 4FG	\$699
SONY 20" COLOR D	\$1100
SONY 15"	\$550
SONY 17" D	\$650
SUPERMATCH 17T	\$870
RADIUS 20V	\$1380

#### **COMPLETE UPGRADES**

LCII, LCIII to Q 605/25mhz \$495

C610,Q610, Q660 to PPC 6100/60 \$850

IIVX, Q650, C650 to PPC 7100/60 \$1265

Q800,Q840AV to PPC8100/80 \$1650

Q800, Q840AV to PPC 8100/80AV \$1850

#### **PRINTERS**

AND RESIDENCE OF STREET	
PRO 630 600DPI	\$1849
PRO 810 800 DPI	\$3995
SELECT 320	\$869
SELECT 360	\$1429
HP INK IFT 310 D	\$275

#### **SPECIALS**

QUADRA 605 4/160 SOFTWARE, EXT. KEYBOARD, 14" COLOR MONITOR \$1145

**EXCHANGE** ANY OLD **POWERBOOK TO NEW 500 SERIES** 

call..... iCN 310-445-6600

FAX: (310) 445-6611

2045-B South Barrington Avenue Los Angeles, California 90025

and SELL and USED MACS

CIRCLE 439 ON READER SERVICE CARD



#### TO ORDER CALL 800•223•462

Supra LC 14.4 Fax/Modem \$99

Lower price on PowerMac **co9429**↔6100/60Mhz, 8/250 .. 1249 C10365↔7100/66Mhz, 8/500 .. 2299 C07119 ↔ 8100/80Mhz, 8/500 .. 2695

Ask for free CD Title when you purchase a complete system

Power	Mac 8100, 110MHz, PowerPC 601 RISC Processor
C28918	→ 72MB/2GB/Apple CD Plus/4MB Vram/21" Monitr. 10777
C63553	↔ 40MB Memory/2GB HD/Apple CD Plus 6666
Power	Mac 8100, 100MHz, PowerPC 601 RISC Processor
C93969	↔ 40/2GB/4mb vram/20" monitor/Extended keyboard 6999
C40961	↔ 24/1GB/CD 4444
C97336	↔ (AV Model) 40MB/1GB/CD 4799
Power	Mac 7100, 80MHz , PowerPC 601 RISC Processor
Santage of the san and	

C88231 ↔ 24/1GB/2vram/17" Monitor/Extended keyboard ...... 4666 C48235 ↔ 24/700MB/CD . 3466 C71048 ↔ 72/1GB/CD ..... 5055

c52636 ↔ (AV Model) 16MB/700GB/Apple CD/2Vram . 3433

#### PowerMac 6100, 66MHz Complete Package C33276 ↔ 16/350MB/CD/15" Color Monitor/Keyboard 2699

Quadra 610, 25Mhz, Built in Ethernet **C85689** ↔ 8/250/Sony CD ..... 1425

free Case with Purchase of PowerBook 500 series (Limited Quantities)

#### PowerBooks 520, 25 MHz, 68LC040 C52162 → 8/160/19.2Fax•Modem .. 2595

C07056 ←> 12/320/19.2 Modem ...... 3087 Due 280-280c, 68LC040, 33Mhz

C32639 ↔ (280) 4/240MB ...... 2466 C29334 ←> (280C) 4/320MB ..... Apple Printers

\$49626 ↔ Personal 320 ..... \$88974 ↔ Select 360 ..... \$48237 ↔ LaserWriter 16/600ps 2298 \$77233 ↔ Color Stylewriter 2400 .... 498 \$79936 ↔ Stylewriter II ............... 285

\$69445 ↔ Color Stylewriter Pro ...... 595 C47564↔ Workgroup Server 8150 Power PC 601 RISC, 80 MHZ, 6399 16/ 1000 MB HD, CD, Apple Share 4.0.2

**\$05859** ↔ Adapter ..... \$72695 ↔ PowerLook w/transpa 2899 \$17617 ↔ UC1260/Photoshop ... 1088 \$93394 ↔ UC1260/Photoshop LE .. 969 \$81056 ↔ Vista S8/Photoshop ..... 979 \$90106 ↔ Vista S8/Phtoshop LE .. 866 \$52180 ↔ UC630 Photoshop LE 489 \$30015 ↔ UC630/Photoshop ..... 589 S01511 ↔ Vista S6/Photoshop ...... 849 s97735 ↔ Automatic Feeder ..... 489 \$31595 ↔ Gemeni GD16 Pro ... 1499 s20847 ↔ Gemeni GD16 LE ..... 1399 **EPSON Scanner** 

S15664	← Epson ES-1200C Pro . 1249
S84115	⇔ Stylus Color Printer 549
000	Calcat Duage

UUU 361661 1 1 633	
P85590 ↔ 600	3595
P90511 ↔ 600 Pro	. 4655
P27156 ↔ 1200	.5699
NECMonitor	
M93093 ↔ 14 MultiSync 2V	335

15 MultiSync 3V 469
15 MultiSync XP15 699
15 MultiSync XE15 569
17 MultiSync XP17 1299
17 MultiSync XE17 1019
21 MultiSync XP21 2499

M69578 ←> 21 MultiSync XE21 ...... 2044

Quadra 950 45Mhz, 68040 72MB/1GB HD/Syquest 88C Internal c92737 ↔ \$5799

Quadra 630, 33Mhz, 68040 **C85689** ↔ 8/250/Sony CD ..... 1495

PowerBooks 520C 25 MHz, 68LC040

C48663 (→ 8/320/19.2 Fax • Modem .. 3595

C54164 -> 12/500/19.2 FAxModem 3799 PowerBooks 540C 33 MHz, 68040

C08178 ↔ 8/320/19.2Fax•Modem 4095

C70997↔ 12/500/19.2Fax•Modem 4444

Apple Monitors
\$33488 ↔ 14" Color Plus 298
\$52267 ↔ Multiple Scan 15" 479
\$13916 ↔ Audio Vision 14" 549
\$56865 ↔ Adapter/ non PowerMac 38
\$18663 ↔ Multiple Scan 17" 988
\$36320 ↔ Multiple Scan 20" 1979
THE PARTY OF THE P

C67689←→ Workgroup Server 9150 Power PC 601 RISC, 80 MHZ, \$7777 16/ (2)1GB Array, CD, DAT, Share 4.0.2

### MICROTEK

\$85997 ↔ III/Photoshop 2469
so1547 ↔ TransparencyAdapter., 139
\$34914 ↔ IIXE/Photoshop 888
\$08272 ↔ IISPXPhotosop 899
\$26358 ↔ IISP /Photoshop LE 747
\$76072 ↔ II /Photoshop LE 488
\$12234 ↔ II HR 1059
\$90725 ↔ IIG
\$64364 ↔ Slide Scanner 35T 959
\$95012 ← AutomaticDocument Feeder 388
\$95012 ↔ TransparencyAdapter, IIXE
IIS, IISPX, II, IIHR 509
NewGen Printer

MEM		n Printer	
P40961	$\leftrightarrow$	ImagerPlus 12/Etherne	et5795
P93969	$\leftrightarrow$	6L W/Ethernet	3829
P61129	$\leftrightarrow$	6L	3439
P85104	0	Design Express B	5595

P29372 ← DesignExpress ovesizer 6299 Texas Instrument P20285 ← microLaser PowerPro . 1649

P74461 ←> microLaser Pro600 65font 1569

P91610 
→ microLaser Pro600 23font1195 Sony Monitor  $M54092 \leftrightarrow 15SF$ . M53916 ↔ 17SF1

 $M97628 \leftrightarrow 20SF1$ 

#### WE HAVE THE BEST PRICE ON MEMORY ANYWHERE MAC 72 PIN SIMMS

(LCIII, CENTRIS, QUARDA, POWERMAC) \$48235 ↔ 4MB 32bit 72pin 70ns ..... CALL \$52636 ↔ 4MB 32bit 72pin 60ns ..... CALL **\$87529** ↔ 8MB 32bit 72pin 70ns ..... CALL \$71048 ↔ 8MB 32bit 72pin 60ns ..... CALL \$51821 ↔ 16MB 32bit 72pin 70ns ..... 444 \$52404 ↔ 16MB 32bit 72pin 60ns ..... 459 \$33362 ↔ 32MB 32bit 72pin 70ns ..... 877 \$46369 ↔ 32MB 32bit 72pin 60ns ..... 899

PINNACLE MICRO Opticals

L90322 ↔ Optical Sierra 1.3 (19ms) ......... cal L74952 ← Optical Tahoe 230 W/Cart) ... 869 L89868 ← Recordable RCD 1000 1 MB cache \$1749 Double speed

OPTICAL VERBATIM CARTRIDGES L68379 ↔ 128MB L22527 ↔ 128MB 3PACK ...... \$75 10PACK ...... \$230 L10493 ↔ 230MB L81837 ↔ 230MB 3PACK ...... \$105 10PACK ...... \$330 L90707 ↔ 1.3GB L51085 ↔ 1.3GB 2PACK ....... \$160 4PACK ...... \$300

MAGING Scanner & Printer \$97628 ↔ ScanTouch 1200DPI........ 1199 \$51821 ↔ Transparency 5X6 ...... ⇔ CoolPrint .... 85 A46369 ↔ 100 sheet Print Pack

SIAI	MUANU	30 PIN MEMO	T FI
S33787	$\leftrightarrow$ 1MB	8bit 30pin 70ns	39
\$85828	$\leftrightarrow$ 4MB	8bit 30pin 70ns	133
S22421	<→ 16ME	8 8bit 30pin 70ns	533
S05597	<→ 16ME	RADIUS ROCKET.	559
Po	werBo	ok 500 Series	1000

\$87637 ↔ 4MB RAM Module ..... \$28834 ↔ 8MB RAM Module ..... **\$04839** ↔ 16MB RAM Module ..... 

PL Syquest Removables R39064 ↔ Infinity 88c/Cartridge .......... 422 R25669 ↔ Infinity 200/Cartridge .......... 544 R87917 ↔ Infinity 270/Cartridge ...... Legend Syquest Removables 509 R12765 ↔ Syquest 88c/Cartridge ....... 368

R21382 ←Syquest 200/Cartridge ....... 488 R54092 ← Syquest 270/Cartridge ........ 489 REMOVABLE SYQUEST CARTRIDGES R27958 ↔ 44MB | R33362 ↔ 44MB

2PACK \$120 5PACK \$280 R90229 ↔ 88MB R76468 ↔ 88MB 2PACK ....... \$140 5PACK ....... \$299 R94342 ↔ 200MB R45834 ↔ 200MB 2PACK ......... \$159 5PACK ........ \$349 R94824 ↔ 150MB R06990 ↔ 150MB 2PACK ....... \$128 5PACK ...... \$290 R04734 ↔ 270MB R40984 ↔ 270MB 2PACK ....... \$139 5PACK ...... \$299

#### Quantum

Daytona PowerBook Drive H33787 ↔ Capacity Access Internal H51259 ↔ 256MB 17ms **H60268** ↔ 514MB 17ms 449 Quantum 3 1/2 inch Drives **H94904** ↔ Capacity Access External

**H58586** ↔ 540MB 12ms. 299 H09998 ↔ 730MB 379 11ms H77452 ↔ 1080MB 9.5ms 999 H89368 ↔ 2100MB 9.5ms ...... We carry both Internal and External drives

All drives are tested and come with the latest FWB HDT tool kit. External Drives come with SCSI Cable & Terminator. All drives come with full factory warranty

#### EXABYTE Tape Backup

T83149 ← 8205, 2-5GB, 263kb/s 8mm 1366 T76988 ↔ 8505, 5-10GB, 500kb/s 8mm 2144 .... 99 \$29852 ↔ Retrospect 2.1 ...... MEDIA

10/12/25 (4MM) 60/90/120 Meters ...

SSUPERMAC. Monitors M48663 ←> Precision 17" Flat .....

M54164 ↔ Precision 20e ...... 1855 M32639 ↔ 2 page 21GS ...... 979 M29334 ↔ Press View 21T ...... 2999 M02488 ↔ SuperMatch 21TXL ...... 1890 M91245 ↔ SuperMatch 17T ...... 850 Video Boards V32368 ↔ Spigot Power AV ...... 749

V27001 ↔ Precision Color 24XP ............ 279 V33062 ↔ Precision Color 24Xk ...... 722 V85828 ←→ Precision Color 24X ...... V22421 ↔ Spectrum power 1152 ....... 699 V05597 ↔ SpectrumSeries V 24 Bit ...... 555 v87637 ↔ Thunder IIGX 1152 ...... 1299 V28834 ←→ Thunder IIGX 1360 ...... 1499 V14346 ↔ Thunder IIGX 1600 ...... 1799 V74103 ← Thunder IVGX 1152 ..... 1799 V24200 ↔ Thunder IVGX 1360 ..... 2099 2599 V87308 ← Thunder IVGX 1600 .......

V07351 ↔ Video Vision Studio NuBus 3479

ASANTE Networking N13363 ↔ 10BT Hub/12 10T, Thk, Thin . 355 N58731 ← Media Adapter.

V09172 ← Thunder 24 GT

MICROPΩLIS

Micropolis AV Drives Capacity H31273 ↔ 2.4GB, 8MS, 7200RPM . 1155 H23216 ↔ 3.3GB, 11MS, 5400RPM .. 1349 H42698 ↔ 4GB, 8.5MS, 7200RPM .... 2149 H16308 ↔ 9.0GB, 11MS, 5400RPM .. 3444

SS Seagate

Capacity H19885 ← 2.4GB Barracuda2 8ms H04146 ↔ 4.2GB Barracuda4 8ms 2485 H14513 ↔ 9.0GB Elite 9 11ms 3765 H06691 ↔ 2.4GB Barracuda4 Wide 2266 H60756 ↔ 4.2GB Barracuda4 Wide

SONY Tape Backup NU DESIGN T98736 ↔ 4GB...... 999 T13602 ← Compression up to 8GB ... 1129

(8MM) 54/112 Meters

15/17 HEWLETT O PACKARD Printers

P83974 ↔ 4ML 300X300,4PPMI ........ 999 1949 P33339 → 4MPlus 1358 P31662  $\leftrightarrow$  4MV 600X600.11X17 TRAY 2750 P20492 299 P02011 ↔ 320 600X300/cutsheet feeder 369 P85393 ↔ 540 600x300 3PPM ...... 281 P97265 ↔ 560C 600X300, 3PPM ..... 529

↔ 1200CPS 600X300, 6PPM . 1599 P47070 WACOM Tablets → ARTZ 6x8 ADB Tablet .

T16656 ← ARTZ 6x8 ADB/Fractall Pantr 474 Art Pad 169 T42751 799 699 809 T19731 ↔ UD 12X18 Electrostatic .

All Returns are subject to restocking fee, must be in original package, condition & needs an RMA#

Prices reflect a Cash Discount. Any other method is 2% higher Prices are subject to change without notice

Address: 6924 CANBY AVE UNIT#104 RESEDA CA 91335

nternational Call: 818•708•6388 Customer Service and Technical support Call: 818•708•6388 Fax: 818•708•6399

1349

CIRCLE 420 ON READER SERVICE CARD

477

989

1895



COMPAGE PACKARD radius Microsoft FUITSU IBM SUFFMAC RELISYS XANTE

POWERMAC	PRINTERS
6100 8/160	LWRITER 360\$1489 LWRITER 630\$1990 LWRITER 1660PS. \$2275 HP 4M+\$1950 HP 4MP\$1395 200 C/PSCALL PJXL300PSCALL STYLEWRITER 2400\$289 STYLEWRITER 2400\$499
STOURY TO SOU CO.CALL	GCC

8100AV16/500 CD.CALL	GCC
SUPERMAC / SONY  17T	ELITE 600\$133 ELITE 600ET\$165 SELECTPRESS 600 . CAL SELECTPRESS 1200 . CAL
THUNDER 24 CALL SPECTRUMV/pdq+CALL CPD 15SF\$485 CPD1730\$919 1730 SE1\$999	INTELCOLOR 20E CAL PRECISION 17CALI PC 24X\$138 PC24XPCALI

SCANNERS

POWERBOOK



PRICES REPRESENT CASH DISCOUNT



Computer Revelations Inc.

1 800 275-9924

in NY 516 737-0800 ALL MACINTOSH, & PCs,

Sales, Leasing, Service & Support

331E DANTE COURT HOLBROOK NY 11741 FAX 516 737-0923

CIRCLE 474 ON READER SERVICE CARD

# **MAC PROFESSIONAL**

We only sell brand new products. No tax outside CA. One year warranty. 6430 Variel Ave., #105, Woodland Hills, CA 91367 Dealers & international orders welcome.

(818) 719-9200

We guarantee

FAX (818) 719-9115

0 10 0 00	Dest prici	ng.	
8100/110	POWERBOOKS	PRINTERS	MONITORS
16/1000 \$5099	NEW LOWER PRICES	Laser Pro 16/600 \$2247	14" Plus \$ 297
40/2000 \$6399	ON ALL POWERBOOKS	Laser Select 360 \$1297	15" Multi \$ 487
72/4000 \$8499	PLEASE CALL	Laser Pro 630 \$1847	17" Multi \$ 977
NEW	PORTABLE PRINTERS	Stylewriter 2400 \$ 497	20" Multi \$1947
	HP DW320	Epson Color Stylus \$ 547	Full Page \$ 347
	w/Sheet Feeder \$ 333	HP DW 540 \$ 307	SONY NEC
8100 24/1000 . \$4097	Color Kit \$ 45	HP DW 560C \$ 497	15 SF \$ 477
8100 40/1.4 \$4647	Citizen Notebook Printer II	HP 1200 CPS CALL	17 SF \$ 897
8100 72/2000 \$5577	w/Color Kit \$ 269	HP 4ML \$ 977	20 SE \$1877
Part State Committee of the Committee of	SCANNERS		XE 17 \$ 987
8100 AV 40/2000 \$5277	The same of the sa		XE 21 \$1987
7100 16/500 \$2877	Nikon Coolscan \$1297		SUPERMAC
7100 24/700\$3347	Nikon Scantouch \$1177		171 \$ 777
7100 40/1000 \$3797	Scan Maker II HR \$1067		21 TXL \$2097
7100 AV 24/700 \$3477	Scan Maker II SPX \$ 967		21 Pressview \$3197
7100 AV 40/1000 \$4097			Video Vision Studio \$3597
6100 16/350 \$1947		SYQUEST	
	Scan Maker III . \$2447		
	UMax Power Look \$2897		
	Epson 1200C \$1297		630/950 CALL
Old III III OALL	apour races e races	are me to the tot	0001000 111111 OPEN
Dringe Are Cubi	ant to Change with	out Motion In Busin	soco Cinco 1000

Prices Are Subject to Change without Notice. In Business Since 1988.

#### WE SPECIALIZE IN CUSTOM MADE CONFIGURATIONS

CIRCLE 495 ON READER SERVICE CARD

# Since 1983

800-809-0880

Voice: 818-704-8923 Fax:

818-704-9858 Quadra

605/630/950. Power Mac 6100 8/250...... 7100 16/500......Call

7100AV/8100AV...Call 8100 16/500CD Call **PowerBook** 

150/520/520C......Call Printers Monitors Hewlett Packard Apple

14"/14"AV....\$375/620 15"/17"......\$475/950 4M Plus.....\$1875 4ML.....\$970 Scanners Apple Color 1....\$860 .\$920

Software

MICROSOFT OFFICE OR ADDIS PAGEMAKER
FOR \$250 WITH ANY PURCHASE.
DEALER & WHOLESALE INQUIRIES WELCOME!
WE ALSO SELL:
COMPAQ, IBM, TOSHIBA

PRICES REFLECT CASH DISCOUNT AND ARE SUBJECT TO CHANGE Well Beat Any Price! Visa, AmEx, & MasterCard Welcome.

WE ONLY SELL NEW PRODUCTS. Sales Tax for Customers outside of Californial 7210 Jordan Ave. D55 Canoga Park, California 91303, U.S.A.

CIRCLE 448 ON READER SERVICE CARD

#### MACS FOR LESS

•BUY• SELL• TRADE •NEW •USED• Systems Prices From Mac+, SE, SE/30, LCI/II/III ....\$199 Mac II/IIx/cx/ci/fx/vx/si......\$199 Classics/II/Color.....\$425 Ouadras & Centris......Call Powerbooks & Portables.....Lowest Power Macs.....Instock Performas......Call Other Mac cpu's & peripherals.Call Mac Clones......Call MP-Computers 800-445-6767 ORDERS ONLY 415.988.0661 Info & Internat'l 415.968.0509 FAX



**CIT Mac Traders** 

(800)990-0995

(310) 576-2466 Mon.-Fri. 9 AM-6 PM Sat.10 AM-4 PM (P.S.T.)

CIRCLE 445 ON READER SERVICE CARD

6100/66 8/350/CD..... 7100/66 8/500/CD...... 2420 7100/80 8/700/CD.....2989 7100/80AV 16/700/CD.....3415 8100/80 16/0......2575 8100/100 8/700......3299 8100/100AV 16/500/CD......4395 8100/110 16/2GB/CD.....CALL

150 4/120.....\$1359 520C 4/160......2625 540C 4/320......3499 540C 12/320/FAX MODEM......3995 540C 12/500/FAX MODEM......4250 Quadra

605 4/160.....\$ 695 630 4/250......1050 CD Rom Drives

Pinnacle 2X Recordable......\$1769 Quantum 540SCSI 3.5".....\$299 Quantum 1.08GB 3.5".....625 We will beat any advertised price Prices quoted are cash prices and are subject to change without notice. Returns subject to 15% restocking charge.

2785 Pacific Coast Highway #178 • Torrance, CA • 90505 CIRCLE 472 ON READER SERVICE CARD

**USED MACS! BUY-SELL-TRADE** 

Top S Paid Via FedEx Next Day Air!

Friendly, courteous service from the Pacific NW!

PACIFIC COMPUTER EXCHANGE PORTLAND, OR

1-800-790-3881 FAX 503-239-8424

CIRCLE 451 ON READER SERVICE CARD

**Full Height** 145.00 Half Height 89.00 3.5" Mini Housing 89.00 2.5" Pocket Housing 89.00

- Closed or Open Front Bezel
   Includes FWB Software & all
- necessary cables. 110/220 VAC Auto Switching
- Power Supply
  Full Height Cabinet will hold
  (2) 3.5" or (2) 5.25" HH Drives

DATAMAX 800-321-4962 26212 Dimension Dr. #220 Lake Forest, Ca 92530 Int'l 714-586-9907 Fax 714-586-6959 MC.VISA.AMEX. GOVT. & UNIVERSITY P.O. 'S WELCOME

CIRCLE 552 ON READER SERVICE CARD



#### **Power Macs**

Market Street of Street	
6100/608/250	\$1,202
6100/608/250 CD	\$1,389.
7100/668/500	\$2,120.
7100668500CD	\$2,306.
710066AV 16500CD	\$2,833.
8100/808/500	\$2,673.
81008016500CD	\$3,197.
8100/80 AV 16/500 CD	£ 3 380

#### **New Power Macs**

6100/66 8/350	\$1,621.
6100/66 8/350 CD	\$1,808.
7100/80 8/500	\$2,583.
7100/80 8/700 CD	\$2,886.
8100/100 8/700	\$3,232.
8100/100 16/1000 CD	\$3,984.

#### **Powerbooks**

Powerbook 150 4/120	\$ 1.335.
Powerboo 520 4/160	\$ 2,022.
Powerbook 520c 4/160	\$2,584.
Powerbook 540 4/240	\$2,815.
Powerbook 540c 4/320	\$4,228.
Dun 280c 4/320	\$3284

#### Performas

475 4/250 w/Software	\$ 795.
630 8/250 w/CD	\$ ,352.

#### **Printers**

Color Stylewriter Pro	\$	561.
Stylewriter II	\$	266.
Personal LW 320	\$	345.
Personal LW 360	\$1,	409.
Laserwriter 16/600	\$2,	120.
Laserwriter Pro 810	\$4.	209.

#### **Monitors**

14" Color Plus Display	\$ 283.
15" Multiple Scan	\$ 454.
17" Multiple Scan	\$ 934.
20" Multiple Scan	\$ 1,878.

Please Call for Custom Configurations. Free 2-Day Shipping w/Orders over \$2,500 (\*) Prices reflect cash discount.

Prices & Availability Subject to Change. Price Protection Guaranteed for 30-Days (\*) All Major Credit Cards Accepted. Int'l Orders Call (305) 477-4441 Local & Int'l Fax (305) 477-4602

(\*) Certain Conditions Apply

#### SUPERMAG



# Government, Corporations 8. Resellers Welcome!

## LUNIPULER PRUS

I-800-319-4MAC (4622) \*\*\*

#### Powerbooks

The second second second second	
PowerBook 150 4/120	\$1395.00
Black Bird 520 4/160	\$2100.00
Black Bird 520 C 4/160	\$2585.00
Black Bird 540 4/240	\$2872.00
Black Bird 54012/240 MOD	\$3509.00
Black Bird 540C 4/320	\$4325.00
Black Bird 540 C 12/320 MOD	\$4945.00
P.B. Duo 280 4/240	\$2395.00
P.B. Duo 280 C 4/320	\$3315.00
Duo Dock II with Ether.	\$ 895.00
Newton Message pad 110	\$ 609.00
Newton PCMCIA fax modem	\$ 175.00
	-

#### **Monitors**

Apple Color Plus 14"	\$ 279.∞
Apple Color Display 14"	\$ 385.00
Apple 14" AV Display	\$
Apple 15" Color Display	\$ 489.00
Apple Multiple scan 17"	\$ 990.00
Apple Multiplescan 20" Display	2025.™
Apple Quicktake 100/p.pc	710.∞
Supermac 17xl monitor	895.∞
Supermac 20Txl monitor	1987.∞
Supermac Thunder/24	1689.00
Apple Extended Keyboard	150.∞
Apple Ergonomic Keyboard	105.∞
Apple Design Keyboard.	\$ 85.00

#### CPU

nclins

Quadra 605 4/160 or	
Performa 475/4/250 with Appl	e Color
Plus Keyboard and software \$	1145.°
Quadra 630 4/250	\$1099.0
P. Mac 6100 8/250	\$1675.°
P. Mac 7100/66 8/500	\$2699.ª
P. Mac 7100/66 AV 16/500/CD	\$3435.°C
P. Mac 8100/80 8/500	\$3875."
Quadra 950 8/0	\$2795.00
P. Mac 8100/110 16/2000/CD	\$5795.°
Server 8150 8/500/ <b>€</b> share	\$4799.00
Server 9150 8/2000/CD	\$6745.°C
Special Rundles	CALL

#### Printers/Accessories

Apple Stylewriter II w/cable	\$ 288.00
Apple Stylewriter Pro w/cable	\$ 605.00
Apple Select 360w/foner	\$ 1495.00
Umax UC-430 Scanner	\$ 749.00
Umax UC-1200 SE	\$ 2659.00
HP II CX Scanner	\$ 995.00
Microtek II XE	\$ 945.00
GCC Printers	Call!
External CD w/speakers	\$ 299.00

Apple Ergonomic Keyboard \$ 105.00 Computer Pros. Miami FL (880) 319 - 4522 International Orders Call: Prices reflect cash discount. Prices subject to change (305) 825-8709







Leasing Plans Available

# No backorders.

We're serious, At AEON TECHNOLOGY we specialize in optical storage products and memory, and service you can count on. Our sales representatives understand the hardware, and can give you a solution no matter what platform you're on, when you need it. Most of our products are stocked at our location, which means they can be shipped to you by the next business day. Call for prices on any items not listed.

Government, School & Corporate PO's accepted. Minimum Five Year Warranty on most items.

1	Pwrbk 500 Series	8/16/32	315/595/1230
>	Duo 200 Series	8/20/28	320/785/1050
OR	PowerMac	16/32/64	435/869/2050
X	8mx8	70ns	285
E	16mx8	70ns	495
L	16mx32	60ns	re Protec 64 May 2330
(E)	Call for Ductor	on other confi	nurations

Call for Quotes on other configuration

Apple Authorized

230 MOs are backwards compatible with 128s: 1.3 gigs are backwards compatible with 650s

	QUANTUM Empire 1616 HD	595	9
U)	QUANTUM Empire 2616 HD		artrid
VE	PINNACLE 1.3Gig MO	2699	one carb
DRIVES	SHARP 1.3Gig MO.	1900	and Stone
Δ.	FUJITSU 230Meg MO.	849	software arry que
	Active SCSI 2 Terminator	30	S soft
L	128Meg Cartridge	19	E SE
A I	128Meg FMTD Cartridge	22	include cables. F Please call us
ш	230Meg Cartridge	31	ode c
-	650Meg Cartridge		pu s
M.O. MEDIA	1.26IG Cartridge		drive
	1.36IG Cartridge		Der .

Mon-Fri 9am-6pm (CST) and then some 9111 Jollyville Road #103 Austin TX 78759 Fax: (512) 338-1665 International (512)-338-4834 E-Mail: sales@aeon.com

WWW: http://www.aeon.com/aeon.html

1-800-937-2366 AEON TECHNOLOGY

CIRCLE 437 ON READER SERVICE CARD

# LOWEST PRICES BEST SERVICE QUADRAS POWERBOOKS PRINTERS MONITORS

POWER PCs call for quotes

Also Available Upgrades & Repairs 310-358-9000

FAX 310-358-9100



Dealers & International Orders Welcome Same Day Shipping in USA

Same Day Shipping in USA We Only Sell Brand New Systems Full One-Year Warranty

"Best Computer Source"
-Computer Magazine

# COMPU AGE

THE SOURCE TO MACINTOSH WORLD 318 N. LA CIENEGA · LOS ANGELES, CA 90048

CIRCLE 542 ON READER SERVICE CARD



# Systems & Parts & Upgrades

#### Clearance Sale! SE POWER SUPPLY SE ANALOG BOARD... sarg APPLE 40-MEG TAPE BACK-UP ..... LASERWRITER TO PLUS ROM UPGRADE ... 99. ADB Mouse ... ......49. jains IIcx/IIci Power Supply ..... 1200 BAUD PERSONAL MODEM W/CABLE.. 29. LC ETHERNET BOARD 49 CRT & YOKE ASSEMBLY FOR PLUS & SE 49. D MAC PLUS MOUSE ... 69 ple PORTABLE 2400 BAUD INTERNAL MODEM. 99. 40-MEG EXTERNAL HARD DRIVE............. 169. MAC CLASSIC POWER SUPPLY ... 99 Mac Classic Power Supply 99. AppleDesign Powered speakers 99. Personal NT Logic Bo 179. Mac Plus Power Supply 119. MAC PLUS POWER SUPPLY







MAC IIX TO IIFX: \$399 40 MHz, MATH CO-PROCESSOR, WICKED-FAST! IIVX TO CENTRIS 650: \$499

Brand 25 MHz 68040, BUILT-IN ETHERNET New! IICI TO CENTRIS 650: \$699

Price includes installation! LCIII TO QUADRA 605: \$299 '040 at 25MHz

CENTRIS 610 TO QUADRA 660AV: \$399 25 MHz, FLOATING POINT UNIT, ETHERNET, A/V TECHNOLOGY

QUADRA 800 TO 840AV: \$599 40 MHz 68040, A/V TECHNOLOGY, 66 MHz DSP



· Virtual Screens · Switchable Resolutions



\$649 New

Apple® Color Printer

11x17 • 360 dpi • ColorSync color-matching • Mac and IBM compatible (SCSI or parallel) . 64 scalable TrueType fonts . also known as the Canon BJC-820

# SHREVE

1200 Marshall St. Shreveport, Louisiana 71101 FAX 318-424-9771 • TECHNICAL SUPPORT 318-424-7987 CUSTOMER SERVICE • PURCHASING • INFO 318-424-9791

ORDERS ONLY

## DoworMac

Poweriviac		
8100/110 16-0	5095	
8100/110 16-2GB w.CD	5995	
8100/110AV 16-0	5395	
8100/110AV 16-2GB w.CE	6295	
8100/100 8-700	3229	
8100/100 16-700 w.CD	3829	
8100/100 16-1GB w.CD	3979	
8100/100AV 16-1GB w.CD	4245	
7100/80 8-700		
7100/80 8-700 w.CD	2895	
7100/80 16-700 w.CD	3199	
7100/80AV 16-700 w.CD		
6100/66 8-350	1619	
6100/66 8-350 w.CD	1819	
6100/66 16-500 w.Dos Card	2549	
Upgrade To PowerMac 7	100	

IIVX/Centris650 1295/1195 Upgrade To PowerMoc 8100 Quadra 800/840av 1595/1350 AV Card Upgrade 285

#### Performa

475 4-250	1049	
530 4-250	1449	
630 8-250 W.CD	1829	
638 8-350/V/TV/CD	2229	
6115 CD 8-350/CD	2599	
550 CD 5-160/CD	1229	
575 CD 5-250/CD	1729	
All Performa's Are Pa	cked	
W/Mnitor & keyboard		

**Buisness Leasing Available** 

Customize & Upgrade Your System W/CD Rom Drive/Hard Drive, Memory, & Modem

Sales (818) 787-3282 Fax (818) 787-5555

#### External HD Drive

EXTOTITION TIP BY		ш
Quantum LTS 540S	279	ļ
Quantum 1GB	575	l (
Quantum EMP2100S	949	ľ
Quantum G. Prix 4.3_	2149	B
SyQuest, Seagate, 2.5"	_ Call	A
Scagate 9GB Elite	3299	П

SOFTWARE

Adobe Illustrator 5.5	3
Adobe Photoshop 3.01	4
Aldus PageMaker 5.0a	4
Aldus Freehand 4.0	3
QuarkXpress 3.3	6
Other Software	C

#### **TOSHIBA Duad-Speed** Ext. CD-ROM W.CD Bundle \$429

**POWERBOOK** 540C

4/320 \$3345

-800- 929-9333

## **POWERBOOKS**

540C 4-320 540C 12-320 Fax/Modem 4045 540C 12-500 Fax/Modem 4345 520C 4-240 270C/280/280C

Trade-In Your PowerBook For A 540C WACOM

Art7 6X8 UD1218/Electro \$679/789

a cecees	-
VideoVision Studio 2.	0 3299
Thunder 24 V.3.0	599
SuperMac 24PDQ+	499
Futura II LX	399
LeMans GT	799
Precesion Color Pro 2	4X 699
Precesion 24XK/XP 3	49/229
SuperMac 17T 17"	749
IntelliColor 20e	1849
PressView 21T	2999
E Machine E-20	899
ProofPositive PostScrip	t 4999
Parkers Landon Au	20.00

**Buisness Leasing Available Dealers & Resellers** 

Call for complete product list & volume discounts

**IBM TOSHIBA** 

#### **Printers & Scanners**

LaserJet 4MP I DW, 310 feeder/320 | 295/310 HP DeskJet 1200C PS: 179 HP IIIP w/PostScript HP ScanJet HCX

#### UMAX.

Vista S6LE/ S8LE

## WHAT ARE YOU LOOKING AT?

ONLY THE BEST MONITOR PRICES IN THE NATION



MITSUBISHI DIAMOND PRO 21T 21" MULTI-SCAN RESOLUTIONS TO 1600 x 1200 NI ONLY 81,795



MITSUBISHI FG6601 FIXED-RES 16" RESOLUTION OF 832 x 624 8345



CAPETRONICS MULTI-MODE 17 RESOLUTIONS TO 1152 x 870



25-N Beta Ct., San Ramon, CA 94583 800-838-1031

CIRCLE 403 ON READER SERVICE CARD

Macworld Shopper offers a great way to reach 575,000 active shoppers.



SHOPPER

# THE FUTURE IS NOW

THE QUATRO 85

19

10



# ARE HERE THE DEALER NEAREST

- 1 ALLTECH ELECTRONICS
- 619-721-0093 OCEANSIDE, CA 2 ADVANCED BUSINESS CENTER MAC SOLUTIONS HOUSE
- TORRANCE, CA

  3 AMERICAN COMPUTER EXCHANGE
- ATLANTA, GA

  ADARRAD SERVICES INC.
- 802-496-2772 WAITEFIELD, VT 5 FEDCOM USA
- RIDGECREST/CHINA LAKE, CA
  6 FUTURE CONCEPTS COMPUTER SPECIALISTS
- 7 KAPPEL'S CONNECTING POINT
- MAC COMPONENTS ENGINEERED 800-5000-MAC IRVINE, CA
- MacExchange COMPUTER OUTLET 216-945-8101 CUYAHOGA, OH
- 10 MAD MAC COMPUTERS
- 11 MAINE ADVANCED COMPUTER SOLUTIONS
- BANGOR, MN

  MICRO COMPUTER NETWORKS
- 914-356-4000 SPRING VALLEY, N.Y. LGSI, LTD- COLOR IMAGING SYSTEMS
- PAPERWORK PLUS COMPUTERS
- SUN CITY, CA PROGENIUS 617-789-4122 BRIGHTON, MA TEKLOGICA
- 609-227-4600 TURNERSVILLE, NJ 7 UNIQUE SYSTEMS 201-656-0500 JERSEY CITY, NJ **18 VECTOR COMPUTING SYSTEMS**
- 718-526-5975 JAMAICA ESTATES, N.Y.

#### CANADA

- 19 COMPUTER PRODUCT CENTRES 800-252-7506 EDMONTON, RED DEER, CALGARY, CANADA
- **20 MAC STATION** MAPLE RIDGE , BC CANADA

#### **INTRODUCING THE QUATRO 850!** THE WORLDS FIRST MACINTOSH CLONE COMPUTER.

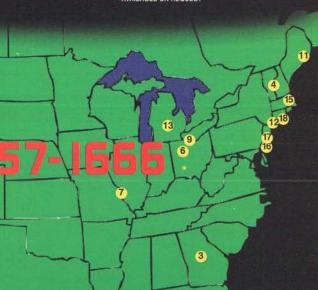
AND THE MOST EXPANDABLE MAC EVER!

# SAMPLE CONFIGURATIONS

8/365 512k vram 14" .28 monitor \$1349

8/540 1mb vram 2x cd-rom, " .28 monitor \$1949

OTHER CONFIGURATIONS AVAILABLE ON REQUEST



FAX 619-441-6999 INTERNET AT "ANJA@EWORLD.COM"

2616 WILLOW BEND PL EL CAJON, CA 92019

CIRCLE 449 ON READER SERVICE CARD

## **UPGRADES & MEMORY**





CIRCLE 543 ON READER SERVICE CARD

**EXCHANGES**•PARTS REPAIRS SELLARY REPAIR PLUS LOGIC 3119+79+59 PLUS ANALOG 399 • 79•59 SE LOGIC \$119+79+59 ANALOG \$119+79+59 MACII LOGIC \$129 - 99 - 89 KEYBOARD REPAIR-\$49 800K DO SURFACE MOUNTS \$69

800-307-695 MACANIX 939 HWY 80 STE 50

160 day HAUGHTON, LA 71037 WARRANTY•INT:318-949-8184

CIRCLE 471 ON READER SERVICE CARD

#### PHONET \$7.90 Connectors

Powerbooks, Quadras, LCs & Much More



Corporate Trade Center 800-416-6338

CIRCLE 413 ON READER SERVICE CARD



HOT SHOPPER PRODUCT CATEGORIES HELP BUYERS FIND THE PRODUCTS THEY NEED FAST.

#### LOWEST PRICE ON ALL MAC MEMORY

#### 30 PIN SIMMS

1X8-80/70 1X8 FX 2X8-80/70 4X8-80/70 4X8 PAL 4X8-FX 8X8-70 16X8-70

#### 72 PIN SIMMS

1X32-70/60 4MB 2X32-70/60 8MB 4X32-70/60 16MB 8X32-70/60 32MB Non Composite

FPU

68882-25 68882-33

PMMU CHIPS ALL PRINTER MEMORY

### LIFETIME GUARANTEE



Tel. 508-683-2325 Fax. 508-975-5232

University, Government and Corporate P.O.'s with approved credit



DRAM 256K DIPS,

1MB DIPS VRAM

256k VRAM, 512k VRAM 4 & 8 BIT VRAM SETS 1 MB VIDEO ZIPS

#### \*\*\*\*\*\* POWER BOOK

100: 2MB, 4MB, 6MB

140.145.170 2MB,4MB,6MB 160,165,180 4MB.6MB,8MB, 10MB 165C,180C 4MB,6MB,8MB,

PB 150 & DUO 210 230, 250, 270C

10MB

4MB, 8MB, 12MB, 14MB, 20MB, 28MB, 36MB

BLACKBIRD 520, 520C, 540, 540C 4MB, 8MB, 16MB, 24MB, 32MB

#### MAC MEMORY - 30 PIN MAC MEMORY - 72 PIN 529 \$144/149 2x32 - 70/60-\$289/299

POWER PC MEMORY

4x32 - 70/60-

8x32 - 70/60-

omega 44

omega 88



QUEST	SER
DC/e	10000
-\$39	20mb
\$22	14mb
O VRAM	12mb
	10mb
	8mb
-\$1070	ómb
-\$598	4mb
-\$298	
	\$598 \$1070 \$2099 O VRAM \$22

\$58

\$535/545

\$1050/1109

-	AAEK	DOO	LAJEIA	OKI		
	520,	520c, 5	540, 540	)c		
	4meg		-\$20	9		
	8meg		\$35	9		
		9-	573	400000		
	32me		-\$14	5000		
	140	160	165c	Duos		
	170	180	180c			
4mb	159	169	165	195		
ómb	219	239	239	256		
8mb	Towns.	299	309	329		
10mb	_	362	369	2000		
12mb	_			529		
14mb	_		_	699		
20mb				949		

VICE IN THE INDUSTRY

WE WILL NOT BE **UNDERSOLD!!** 

00-989-6348

Huntington Beach, CA 92648
FAX - 714-842-9437
7am - 6pm Monday - Friday P.S.T.
NOW OPEN SATURDAY 10-3PM

14-848-5958

WE BUY USED MEMORY **GREEN MEMORY** 714 • 842 • 1227

18685 MAIN STREET #607, HUNTINGTON BEACH, CA 92648

CIRCLE 516 ON READER SERVICE CARD

#### Upgrade Specialists Memory

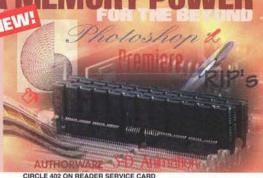
CIRCLE 447 ON READER SERVICE CARD

64MB and 128MB SIMMs you can now have up to one gigabyte of RAM in your Quadra or Power Mac. . . And do anything you want . today, tommorrow. beyond!

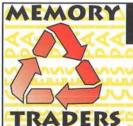


1-800-636-7281

228 N. Pennsylvania Wichita, KS 67214 USA



CIRCLE 402 ON READER SERVICE CARD



1117 N. 19th St., Ste. 1201

Arlington, VA 22209

Ph: 703-243-4006

FAX: 703-522-6626

WE BUY USED

NO HIDDEN CHARGES! VISA/MC - NO EXTRA CHARGE PRICES INCLUDE SHIPPING LIFETIME WARRANTY

WORKING OR BROKEN ANY QUANTITY ANY SPEED

RMB 16MB 32MB VRAM PB 2MB-10MB

256K 512K

1MB

2MB

4MB

**WE SELL NEW MEMORY** 

CIRCLE 409 ON READER SERVICE CARD

# HERAL800259-6565

Call us last! We will try to beat all reasonable competitor's price!

MacUser



#### Standard 30 pin SIMMs

1 Megabyte	from 35.00
2 Megabyte	74.00
4 Megabyte	125.00
8 Megabyte	289.00
16 Megabyte	525.00

#### Video RAM

4 Bit to 8 Bit Upgrade (Mac II/IIx cards)	24.00
256K Quadra 700/900,	42.00
Performa 46X VRAM	13.00 15.00
256K Quadras, LC 520 VRAM	
512K VRAM for LC, LCII, Ilvx,	15.00
Ilvi, DuoDock, and Performas	35.00

#### **68882 FPU Boards**

25 MHz for Macintosh LC/LCII	55.00
20 MHz w/2 slots for Mac Ilsi	119.00
25 MHz for Mac Classic II	55.00

#### **Newton Products**

512K Static RAM Storage Card	115.00
1 MB Static RAM Storage Card	165.00
2 MB Static RAM Storage Card	279.00
2 MB Flash Storage Card	235.00
4 MB Flash Storage Card	399.00
8 MB Flash Storage Card	525.00
16 MB Flash Storage Card	895.00

#### **Math Coprocessors**

68882 16 MHz FPU	39.00
68882 25 MHz FPU	45.00
68882 33 MHz FPU	49.00
68882 50 MHz FPU	99.00
68881 16 MHz FPU	45.00

#### Miscellaneous

LaserWriter 320 2,4, and 6MB upg	rades_CALL
LaserWriter Pro 810 4/8 MB upgrad	
T.I. MicroLaser 1 MB	49.00
Mac Classic 1 MB Board	75.00
68851 16MHz PMMU	89.00
Mac Portable 3 MB Card	369.00
Mac Portable 4 MB Card	399.00
Mac Portable 5 MB Card	449.00

# DiiMOCache 50MHz Accelerator \$445

## Speed up everything you do by up to 400%

with this 50MHz 68030 accelerator by DiiMO Technologies. Awarded 41/2 Mice in MacUser's April 93 Accelerator Review, the DiiMOCache 50MHz 68030 Accelerator outperformed not only DayStar's PowerCache 50MHz but also most of the 68040 25MHz accelerators. And it costs less too! For the LC, LCII, LCIII, II, IIx, IIcx, IIci, IIvx, Ilvi, Ilsi, SE/30, and Performa 600 and 400 series. Call for adapter prices.

DiiMOCache 50MHz 68030 Accelerator

without FPU \$445.00 with FPU \$519.00

We will buy your old memory at great prices! Call for details.

/Z PIN Wemory	for the	new Ma	acs!
Manahuta	80 ns	70ns	60 n

4 Megabyte	
8 Megabyte	
16 MB-Non Composite	
32 MB-Non Composite	

#### PowerBook-500 series Memorv

4 Megabyte upgrade	185.00
8 Megabyte upgrade	329.00
16 Megabyte upgrade	659.00
32 Megabyte upgrade	1375.00

#### PowerBook-100 series Memory

	100	140/1/0	100/180	100c/180c	Duos
2 MB	79.00	79.00			
4 MB	125.00	109.00	109.00	109.00	189.00
6 MB	179.00	149.00	149.00	149.00	-
8 MB			215.00	215.00	349.00
10 MB			269.00	269.00	
12/14 MB					525/599
20/28 MB					875/1229
	4 MB 6 MB 8 MB 10 MB 12/14 MB	4 MB 125.00 6 MB 179.00 8 MB 10 MB 12/14 MB	2 MB 79.00 79.00 4 MB 125.00 109.00 6 MB 179.00 149.00 8 MB	2 MB 79.00 79.00 4 MB 125.00 109.00 109.00 6 MB 179.00 149.00 149.00 8 MB 215.00 10 MB 269.00 12/14 MB	2 MB     79.00     79.00     ——     ——       4 MB     125.00     109.00     109.00     109.00       6 MB     179.00     149.00     149.00     149.00       8 MB     ——     ——     215.00     215.00       10 MB     ——     ——     269.00     269.00       12/14 MB     ——     ——     ——

# PROCESSOR W/FPU

40MHz- \$699.00

FOR THE CENTRIS/QUADRA 605, 610, 650, AND 660AV. AND THE PERFORMA 475/476 AND LC 475. 33MHz for Quadra 650 & LC 575 - \$399.00

## **68040 Accelerators for 610s**

The CentrisBooster and QuadraBooster take your Centris/Quadra 610 to super-sonic speeds! Double the clock speed of your Centris 610 by installing our 40MHz 68040 accelerator, or make your Quadra 610 fly with the 50MHz version. The Centris version is also available in a \$245.00 configuration which includes Motorola's 'mathless' 68LCO40 processor.

68040 40MHz Accelerator for Centris 610	\$395
68040 50MHz Accelerator for Quadra 610	\$595

## Cache Cards, Etc

256K Level 2 Cache Card for PowerMacs	125.00
128K Cache Card for LCIII and Performa 450	129.00
Ilsi 64K Cache Card/Ilci 64K Cache Card	159/125
Ilsi 2-slot Card and 68882	119.00
Quadra 700/900 128K Cache Card	125.00
Quadra 800/950 128K Cache Card	195.00
Slot-Free Cache Card for LC 475	195.00
Slot-Free Cache for 660AV, 700, 900, and 950	245.00

## TOLL FREE TECH SUPPORT

LIFETIME WARRANTY ON ALL MEMORY PRODUCTS ORDER BY 6:30 PM CST FOR SAME DAY SHIPPING\* OVERNIGHT DELIVERY FROM \$8.00 "some restrictions apply

# PERIPHERAL OUTLET, Inc.

327 East 14th, PO Box 2329 • Ada, Oklahoma 74820 405/332-6581 FAX 405/436-2245 . AppleLink-PERIPHERAL HOURS: Monday-Thursday 6AM-7 PM CST, Friday 6AM-6 PM

Due to volatility in the market all prices and availability are subject to change without notice. We accept Visa/MC/Amex/Discover, and COD Cashiers check upon approval. Educational, Government, and Fortune 500 P/Os accepted upon approval

Heat Sink- \$19.00

## Adesso • AGFA • Asante • Daystar • Dayna • Farallon-Global Village • BTI • Umax • Nikon



#### DRIVES

#### RUMI SYOUEST DRIVES

Rumi	88MB SyQuest (W/ FREE Cartridge)		379
Rumi	200MB SyQuest (W/ FREE Cartridge)	)	529
Rumi	270MB SyQuest (W/ FREE Cartridge)	)	529
Rumi	105MB SyQuest (W/ FREE Cartridge)	)	375
		The second second	ALC: N

#### RUMI CD-ROM DRIVE

Doublespeed, Multisession Photo CD, NEC Mechanism.

#### **OPTICAL DRIVES**

Rumi 230	\$679
PMO Tahoe 230 .	\$979
PMO Sierra 1.3 .	\$2849
PMO Sierra 2.6 .	\$5759
PMO RCD 1000 .	\$1899

PMO Tahoe 230	\$979
PMO Sierra 1.3	\$2849
PMO Sierra 2.6	\$5759
<b>PMO RCD 1000</b>	\$1899

#### POWERBOOK DRIVES

Internal 340MB.....\$389 Internal 510MB.....\$489

#### RUMI DAT DRIVES

Rumi 4.0GB DAT Drive w/Retrospect*	.\$1049
Rumi DDS / 8.0GB w/Retrospect*	.\$1149

#### 040 ACCELERATORS

POWER CARDTM 601

THE ONLY POWERPC UPGRADE FOR YOUR OUADRA 630 & 605. LC & PERFORMA 630,

470, 570. Item# 3729

40MHz Turbo 040 with 128k cache	\$815
33MHz Turbo 040 with 128k cache	\$729
33MHz Turbo 040i with 128k cache (no	FPU)\$619

Authorized Resellers





SyQue

SyQuest

#### CD-ROM BUNDLE

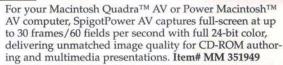
Includes RUMI CD-ROM Drive, Sony Speakers and 4 CD Titles: •World Atlas •Myst •Lunicus •Where in the World is Carmen Deluxe

#### RUMI HARD DRIVES

88 MB C

Rumi 160MB Int / Ext (Quantum)\$189 / \$255
Rumi 365MB Int / Ext (Quantum)\$229 / \$285
Rumi 540MB Int / Ext (Quantum)\$279 / \$325
Rumi 730MB Int / Ext (Quantum)\$345 / \$405
Rumi 1.0GB Int / Ext (Quantum)\$645 / \$705
Rumi 2.1GB Int / Ext (Quantum)\$1085 / \$1145

### \$829 SuperMac SpigotPower AV





# You Can Trust

# Call: 1 800-840-2212

#### **POWER MAC CACHE**

Level 2 cache raises the 6100/7100 performance, in some cases getting up to 48% more speed. #NPM 256K CACHE ......\$189 #NPM 512K CACHE **#NPM 1MB CACHE** 

#### MAC CLIP 40% MORE POWER!

#N7MC040-QC Quadra 840/840AV



#N7MC040-SC Centris/Quadra 610/650

#### **POWER CLIP**

For Power Macintosh 6100/60, 6100/60AV, 7100/66 and 7100/66AV.

#N7MC601

\$299 Special Power Mac Bundle!

## EMORY

POWER MAC, CENTRIS, QUADRA, LC III, PERFORMA

Newer
\$185/\$189
355/359
\$559/\$569
51,070
\$549

VRAM Newer 256K VRAM 512K VRAM

8-BIT MEMORY Newer

1x8x70	*44
2x8x70	184
4x8x70	
4x8x70 (II, lbx)	
4x8x70 (IIfx)	169
8x8x70	
8x8x70 (IIfx)	*349
16x8x70	529
16x8x70 (Radius	Rocket)

#### PRINTER MEMORY Newer Las

												-	-													×
serwriter 810-4ME	i,		14	1		1	*	5	*	٠	(a)	20	ě.		8		56		14	×.	æ	140	b	80		2
serwriter 810-8ME	١.	100			ia.				'n.	W		8		16			8	4			2	40			22	4

**POWERBOO** 

#### POWERBOOK MEMORY .\$220/\$309

PB100-4/6 PB160/165/80-4/6/8/10 .... PB165c/180c-4/6/8/10 ... \*126/\*185/\*269/\*349 PB520-540c-4/8/16/32 ... \*219/\*399/\*721/\*1,255 PB210-280c-8/12/20/28 . . \*411/\*585/\*855/\*1,259 Base Module-4/12 ............\$219/\$674 Upgradeable PowerBook DUO modules. SCSI MICRODOCK SCSI MicroDock . . . . . .141 Docking station for PowerBook Duos, allows SCSI devices to be attached. Color MicroDock . . . . . . . . Docking station for PowerBook Duos to add color monitor, keyboard and speakers. Ethernet MicroDock . . . . 192 PowerBook Duos can quickly and easily be attached to networks.

Call for VSO's and Meteor Accelerators!

• MICROTEK • WACOM • US ROBOTICS • KENSINGTON • PROMETHEUS • ZOOM • MOMENTUM • SUPRA

To Order Call 1-800-848-8967 Fax Your Order To: 206-746-5168 For International Call: 206-746-0229

Electronic orders:Compuserve @ 73423, 1272

CIRCLE 563 ON READER SERVICE CARD

## • RASTEROPS • HP • POLAROID • VERBATIM • SYQUEST • PINNACLE MICRO

POWERBOOK MEMORY	MEMORY
PB140-170-4/6	
PB160-180-4/6/8/10	\$109 / \$149 / \$209 / \$259
PB165C-180C-4/6/8/10	\$109 / \$149 / \$209 / \$369
DUO 210 - 280C 4/8/12	
DUO 210 - 280C 14/20/28	
PB 520 - 540C 4/8/16/32	\$179   \$335   \$625   \$1149

P	OW	ERB	OOK	A	CCESS	ORIES

I OWERDOOK PICCESSORIES	
Charger & Conditioner - PB140-180 / PB5xx	\$75 / \$219
Long Life Battery 140-180c	
Automobile Adapter 100-180 / DUO / PB5xx	\$69
SlimPack 140-180 / Duo	.\$145 / \$235
Mini AC Adapter 140/180c / Duo	\$50
PB 140-180 Twin Travler Double Battery Charger	\$55

We also carry Kensington Security Cables & Carrying Cases.

STANDARD 3	30 PIN MEMORY
1x8x80\$37	4x8x80 (IIfx)\$145
1x8x70\$39	4x8x70 (Hfx)\$147
1x8x100\$35	4x8x80 (H,Hx)\$139
2x8x80\$79	4x8x70 (II,IIx)\$141
2x8x70\$81	8x8x70 (IIfx)\$349
4x8x80\$130	16x8x70 (Low Profile)\$609

#### VIDEO RAM / FPU'S ETC...

VIDEO IN MILITARIO O	
Video RAM 256K / 512K	. \$20 / \$38
16MHz LC / Color Classic	\$49
16MHz Classic II	\$59
25MHz LC III	\$49
33MHz Performa 600 / Duo Dock FPU	\$65
Centris FPU	\$299

We have a Lifetime Warranty on all of our memory products. Prices and availability are subject to change without notice.

4x8x70 .....\$132



#### POWERPC. CENTRIS, QUADRA, LC III

V RAM When You Buy Memory

4MB-70ns / 4MB-60ns	\$162 / \$165
8MB-70ns / 8MB-60ns	\$305 / \$309
16MB-60ns non-composite	\$469
16MB-70ns non-composite	\$467
32MB-60ns	\$929

# 5949

#### AGFA STUDIOSCAN II SCANNER

400 ppi x 800 ppi and interpolated to 2400 ppi. Includes: Omni Page Direct, Foto Snap, Foto Look, Foto Tune LT and Photoshop LE. Item# AG Studio II

#### POLAROID SPRINTSCAN 35 SLIDE SCANNER

Scan 35mm slides up to 2700 dpi - in under a minute! The ideal desktop solution for anyone in need of a high quality slide scanner. Item# PLD619111

MICROTEK SCANMAKER IIHR \$1,099
MICROTEK SCANMAKER IISPX\$919
MICROTEK SCANMAKER III\$2559
UMAX POWERLOOK \$3045

UMAX VISTA S6	\$799
UMAX 630 / 630L	\$769/\$595
NIKON COOLSCAN	
I CHOE CLIDE CONNER	£12/0

16x8x70 (IIfx) ......\$635

GLOBAL VILLAGE TELEPORT GOLD IITM

ITEM# 137318 TELEPORT BRONZEIITM 24/96/48	ITEM# 137318
Item# 137323 POWERPORT DUO 2XX MERCURY 19.2	Item# 137323
ITEM#137320 POWERPORT 1XX MERCURY 19.2 PB 100-180C	ITEM#137320
ITEM# 137335 POWERPORT 5XX MERCURY/500 SERIES. 19,200 DATA 14,400\$342	ITEM# 137335
ITEM# 50V34E-MC SUPRA 28.8 V.34\$229	ITEM# 50V34
ITEM# 5014XP SUPRA EXPRESS PLUS 14.4	ITEM# 5014XI
ITEM# USR 317146 U.S. ROBOTICS MAC&FAX SPORTSTER® TRUE V.34\$265	ITEM# USR 3
ITEM# USR 388979 US ROBOTICS SPORTSTER 14,400 MAC&FAX\$160	ITEM# USR 3

## ler Call: 1 800-450-4552



THE RESERVE TO SERVE THE RESERVE THE RESER	_
Entertainment 45	
7th Guest	.\$59.00
Star Trek 25th Anniversary Ed	\$47.00
11th Hour	.\$69.00
Cosmology of Kyoto	.\$68.00
Voyeur	
Virtual Guitar	
Xplora Holiday Deluxe Edition	.\$65.00

#### Graphics Corel Photo CD's \$25.00

Multimedia

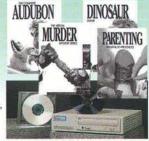
#### • Rumi Double-speed CD-ROM Drive 210 For Mac • 10 Creative Multimedia Corp. CD-ROM Titles

Including: Audobon's Mammals, Audobon's Birds, Complete Shakespeare, Sherlock Holmes, Beyond the Wall of Stars, Dinosaur Safari, Who Killed Sam Rupert?, Who Killed Elspeth Haskard? (Magic Death), Parenting: Prenatal to Preschool, Total Baseball '94 Item# CMC BNDL

RCD 1000 Item# RCD1/M .....\$1899

. \$86.00
. \$38.00
\$125.00
. \$52.00
. \$79.00
\$36.00

neierence	
Microsoft Encarta 95	\$89.00
Comptons Interactive Encyclopedi	a\$78.00
Street Atlas USA	\$76.00
PhoneDisc PowerFinder	\$148.00
Dr. Schuelers Home Med Advisor Pr	o\$46.00
Groliers 95 Multimedia Encyclope	dia \$89.00
Street Atlas USA	\$76.00 \$148.00 o\$46.00



## AUDIO-VIDEO-COMPUTER MEDIA

4	SYOUEST 1-4	5-9	10+	
ø	The second secon		\$40	SyQuest
	44MB 5.25"\$42	\$41	100000	
	88MB 5.25" \$48	\$47	\$46	理理・
	200MB 5.25"\$76	-	\$74.75	THE PARTY OF THE P
	270MB 3.5"\$59	\$58	\$57	
	105MB 3.5"\$55		\$54	
eo	\$4.99			\$57
	ade\$6.99			31

8mm 120 Video High Grade	. \$6.99
8mm 180 Video Metal Evap	.\$24.99
Hi-8 120 Metal Partial	\$8.99
VHS 120 Min. Video	\$3.99
S-VHS 120 Min. Video	
Sony CD-ROM 74 min	\$13.99

SONY 8mm 120 Min. Vi

3.5" Optical Disk	3.00
CD-R 63 min\$12	
CD-R 74 min\$13	3.99
4mm DAT 60 meter\$6	5.99
4mm DAT 90 meter	3.99
4mm DAT 120 meter	3.99
3.5" DSHD Floppy Disk\$4	1.99
3.5" DSHD Floppy Disk\$6	5.99
3.5" DSHD Floppy Mac	1.99



3.5" Optical 128 MB	\$28.00
3.5" Optical 128 MB Mac	
3.5" Optical 230 MB	\$45.00
5.25" Optical 650 MB	\$75.00
5.25" Optical 1.3 GB	\$99.00
CD-R 63 min	\$12.99
CD-R 74 min	\$13.99

Call today for additional DAT Tapes, Floppy Disks, Flash RAM, Video, Audio, Beta, and Mini Disc!

### • Super mac • Radius • Sonic • Technology Works • CoStar • Sony • NEC • Komag • Bernoulli

- Airborne Express Overnight <sup>8</sup>6 and up
- First quality brand new products P.O.'s accepted upon approval
- No. s accepted upon approval
   All major credit cards accepted No surcharge-Charged when order shipped
   Prices subject to change Not responsible for typographical errors
- Orders received before 7:30 pm EST weekdays shipped same day
- We export to most countries in the world
- All returns require approval and are subject to a restocking fee Open 6 am to 7 pm M–F. 9 am to 4 pm Saturdays No sales tax except applicable sales tax in WA

WD-045



# **ENERGIZE YOUR MAC WITH MAC Xtra!**



Memory For Your Macing	tosh!
1x8x80 \$36	4-00
2x8x80\$77	5129
4x8x80 <sup>\$</sup> 129	4x8x80
4x8x80 II/IIX\$145	
16x8x80 (Low Profile) \$589	
1x8x80FX\$36	
4x8x80FX\$136	70
16x8x80FX\$560	PB520-540C-4MB
	de la companya del companya de la companya del companya de la comp
\$155	PowerBook
	PB 520-540C 4MB \$170
4MB 72pin 70ns	PB 520-540C 8MB \$324
32 Bit /72 Pin	PB 520-540C 16MB/32MB \$633/\$1,339
	PB 140-170 4MB/6MB \$94/\$142
Quadra, Centris,	PB 160-180 4MB/6MB \$95/\$135
Power Mac	PB 160-180 8MB/10MB \$202/\$275 PB 165C-180C 4MB/6MB \$102/\$181
4MB 72Pin (70NS/ 60NS) \$155/\$157	PB 165C-180C 8MB/10MB \$219/\$280
8MB 72Pin (70NS/ 60NS) \$292/\$309	PBDUO 4MB/8MB\$170/\$325
16MB 72Pin (60NS)\$479	PBDUO 12MB/14MB \$482/\$560
32MB 72Pin (60NS) \$989	PBDUO 20MB/28MB \$807/\$1,275

#### Modems **US Robotics** 28.8 V.34 Prometheus \$244 Zoom Zoom FXV 2400/9600 S/R Fax .... \$116 Zoom VFX 14.4 v.32bis S/R Fax ... \$169 Haves Accura 144+Fax 14.4 Mac ....... \$164 Optima 144+Fax 14.4 Mac ....... \$403 Optima 144+Fax 14.4 Pocket Mac \$303 US Robotics Sportster 28.8 Mac & Fax...... Sportster 14.4 Mac & Fax.....

#### Printers/Scanners Citizen Citizen Notebook II ..... UMAX Umax UC630/UC630LE ..... Microtek Scanmaker IISP/IISPX ....... \$799/\$949 Scanmaker IIHR/III ...... \$1,099/\$2.599

Genuine SyQuest	E Sygant
\$62	210
44MB 1-4/5-9/10+ 44MB Pre-Formatted	561
88MB 1-4/5-9/10+ 88MB Pre-Formatted 200MB 1-9/10+ 105MB 1-9/10+	\$69 \$79/\$77
270MB 1-9/10+	*62/560

Dayna         DaynaPort Pocket SCSILink-T         *231           DaynaPort SCSILink         *247           DaynaPort SCSILink PowerBook T*266         2247           DaynaPort SCSILink PowerBook T*266         264           DaynaPort EXIL-Triendly Net)         *54           DaynaPort EXIL-Triendly Net)         *88           DaynaPort EXIL-Triendly Net         *88           DaynaPort EXIL-Triendly SEX         *87           DaynaPort EXISO-T IISI & SEX         *94           DaynaStar Mini Hub 5 10Base T         *151           DaynaStar Mini Hub 10Base T         *193           Farallon         *179           EtherWave Nubus Card         *179           EtherWave Mac PowerBook         *293           EtherWave Printer Adapter         *278           EtherMac LC-C         *170           EtherMac LC-10T         *84           PhoneNet Connecter         *28

Xtra Media
Verbatim 128MB Optical \$30
Verbatim 650MB Optical
Verbatim 1.3GB Optical \$105
Verbatim RCD 74Min \$13.99
Komag         \$28           Komag 128MB Optical         \$79           Komag 1.3MB Optical         \$99           TDK         \$99
TDK 128MB Optical \$28 TDK RCD 74Min \$13.99
Xtras Xtras Xtras

PowerPC Cache 256K ...... \$185 FPU LC/LCII/LCIII ..... \$49/548

FPU Classic II ...

FPU Color Classic	\$48 \$59 \$299
Radius Video Cardi Precision Color 8XJ Nubus Precision Color PRO 24XK Nubus Precision Color PRO 24XY Nubus Precision Color PRO 24XP Nubus PhotoBooster for Rocket PhotoBooster 68040-66 SuperMac Spectrum/24 Series V Nubus Spectrum/24 PDO Nubus Spectrum/8 24 PDO Nubus Spectrum/8 Series III Nubus Video Spigot Nubus 24bit-DAC Video Spigot Mac LC 24bit-DAC Thunder II Light Nubus 1152×870 <sup>5</sup>	461 768 461 615 768 850 510 382 382 243

	Xtra Drives Drives
	Xtra Drives
	SyQuest 44/88MB w/Cart \$289/\$399
ı	SyQuest 200MB w/Cartridge \$539
	SyQuest 105/270MB w/Cart. \$379/\$539
	128MB Optical 30ms \$849
	230MB Optical 30ms \$929
	CD-Rom Photo CD 2x \$199
	10GB DDS/2 Dat \$1,199
	270MB Int /270MB Ext \$219/\$279
	340MB Int /340MB Ext \$279/\$339
	540MB Int /540MB Ext \$309/\$369
	Powerbook 256MB/340 Int \$389/\$449
ø	

Accessories
Wacom
6x8 ARTZ ADB UD-Series Tablet \$299
12x12 UD-Series Tablet \$498
12x18 UD-Series Tablet 5761
18x25 SD-Series Standard \$2,561
Cordless Non-Pressure Sens. Sty. \$52
4 Button Cursor for UD 12x12 \$104
4 Bullon Cursor for OD 12x12 104

MONITORS	
Radius Precision Color 17" Multiscan \$1,075 Precision Color 21" \$2,110 Full Page Display 15" Mono \$496 NEC	
5FGE 17" Multiscan .28	
SuperMac SuperMatch 17T Professional \$1,009	
SuperMatch 17XL 17"	



MAC Xtra • 1075 Bellevue Way NE, Suite 114 Bellevue, WA 98004 • Phone: (206) 746-3803 Fax your order 24 Hours a day! (206) 746-5324 MasterCard, VISA & Discover
 – NO Surcharge

· Prices subject to change

\$55

· Returns subject to approval and restocking fee 7:00 AM to 6:00 PM M-F - 9:00 AM to 4:00 PM Sat - PST

Overnight Delivery – \$7 and up/ UPS Ground – \$6 and up

CIRCLE 561 ON READER SERVICE CARD



## **UPGRADES & MEMORY**

## **MOBILE COMPUTING & PDA'S**

#### **Memory Wanted** WE BUY NEW OR USED SIMMS

256K, 512K, 1MB, 2MB, 4MB, 8MB, 16MB, 32MB.

30 Pin, 64 Pin or 72 Pin.

#### POWERBOOK 2MB - 28MB



We Puy In Quantity Call Us or Send Far INNOVATIVE MICRO PRODUCTS, INC 7645 Leesburg Pike, Suite 201 Falls Church, Virginia 22043 Tel.: 703-848-0711 Fax: 703-848-0712

CIRCLE 462 ON READER SERVICE CARD

#### Mac UPGRADES! MEMORY Mac MEMORYPowerMac 72 PIN INEW!! 1MB 8-70NS 2MB 8-70NS 4MB 8-70NS 8MB 8-70NS 16MB 8-70NS VIDEO MEMORY 256K VRAM !! SYQUEST !! SALE !! SyQuest Tape Drive SyQuest 88C Int. \$349 512K VRAM EXCHANGE

# WANTED: **USED SIMMS & MACS**

256K-32MB • All Macs & Peripheral

(Trade-Ins Welcome)

New SIMMS available

**MacSolutions** Fax:(310)394-7744

CIRCLE 410 ON READER SERVICE CARD

#### ACCELERATORS/FPUs



CENTIS QUADRA!

No FPU/FPU 40MHz 68040 Centris 610 S249/S399 50MHz 68040 Quadra 605/660av

Quadra 605,610,700,900 \$599 Mobius Speedster 25MHz 040 \$349/\$449 33MHz 030 w/Video Mac SE \$249/\$299 25MHz 020/FPU LC 599 33MHz 030/FPU LCII, P400-430 \$149 33MHz 030 Mac II, IIx \$149/\$199 256K Cache Card PowerMac \$199 68040-25 FPU Q605,610, LC475 \$249 68040-33 FPU Q,LC,P575/630 (\*with 6810040 trade-in ) \$299

68882 FPU LC I-III, Duo, etc. \$49 68851 PMMU w/Mode32 Mac II \$99

SONN@ TECHNOLOGIES
Irvine California Since 1986 714-261-2800 Fax 714-261-2461

800-945-3668



Gov't./Corp./Educ. P.O. VISA One year warranty!

CIRCLE 463 ON READER SERVICE CARD



HOT SHOPPER PRODUCT CATEGORIES HELP BUYERS FIND THE PRODUCTS THEY NEED FAST.

## L2 Cache for Power Macintosh! 1024K Cache as low as 256K Cache Power Mac speed gains up to 90% Easy Installation – Plug in and GO! Includes FREE Benchmarking Software No Sales Tax Charged Outside Georgial

CIRCLE 421 ON READER SERVICE CARD

15 Day "No Questions Asked"
Money Back Guarantee (& 1 yr. warr.)
For orders, call: (800) 527-9772
Info:(404)641-9650, L2@atlanta.com
FAX: (404) 641-9433
FedEx/D

CIRCLE 460 ON READER SERVICE CARD

## Dynamic Engineering

PowerBook & Duo Accelerator

Portable Products Memory, HDD, Battery

435 Park Dr., Ben Lomond, Ca. 95005 Fax 408-336-3840

VISA/MC 336-8891

CIRCLE 411 ON READER SERVICE CARD

**GUARANTEED LOWEST PRICES** Memory for Desktops, Laptops, Laser Printers from Apple to Zenith

WE BUY EXCESS MEMORY 1-800-808-6242

ERITECH INTERNATIONAL 818/244-6242 FAX 818/502-5059 740 N. Glendale Ave., Glendale, CA 91206

CIRCLE 469 ON READER SERVICE CARD

Kablit™ Security

#### STOP COMPUTER THEFT! IN THE OFFICE — ON THE ROAD

Secure Computer or notebook to desk, table, etc.

Lock disk drive — Protect data

Lifetime warranty

MacKāblit™ II - List \$49.95



Fixed Location



Quick And Easy To Install

Travels With Your Notebook

A \$200 Value For \$99.95! The KENT-MARSH Night Watch II., and the Sentinel Security System together provide both hardware and software security — at an unbeatable price!

Order now — Call 800 - 451-7592...

Secure-It

18 Maple Court, East Longmeadow, MA 01028 arks used are trademarks of the Master® Lock Company and are used by Secure-It, Inc. under license.

CIRCLE 574 ON READER SERVICE CARD

### Power PC Cache Cards

for Power PC 6100, 7100, 8100, and the new Performa 6100 series

256K Level 2 Cache: \$149 512K Level 2 Cache: \$299 1 Meg Level 2 Cache: Call

'Add a 1 Meg cache card to your 6100 to achieve 8100 performance"

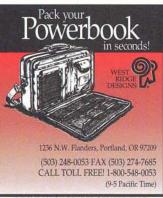
#### Sequoia Circuits, Inc.

1408 Maxwell Way, San Jose, CA 95131



1-800-652-1800 408-453-1103 FAX 408-978-5754

CIRCLE 455 ON READER SERVICE CARE



CIRCLE 444 ON READER SERVICE CARD

# NETWORKING & COMMUNICATIONS ACCESSORIES **EDUCATIONAL & RECREATIONAL**





VIDEOCONFERENCING . HIGH-SPEED FILE TRANSFER . BBS

### ISDN

#### Essential and Affordable Communications Technology



ISDN solutions for Macs and PCs starting at under \$500 - NuBus cards, routers, terminal adapters and related software . Drag-and-drop file transfers at 1 MByte/min and faster • highspeed Internet or remote LAN access (TCP/IP and AppleTalk) via PPP • desktop videoconferencing • advanced telephony management •

NTERNET ACCESS • TELEPHONY

#### Synapse USA your ISDN source

Sales: 800-454-ISDN Tech Support: 312-871-1466 e-mail: synapse@mcs.com

REMOTE LAN ACCESS • APPLETALK ROUTING • ARA • PPP

CIRCLE 468 ON READER SERVICE CARD



\$189

\$269

-800-37

Call Now!

Free Catalog!

50 E. Pallisade Ave. #200 • Englewood, NJ. 07631 • Info (201) 569-6262 • Fax (201) 569-0330 • SPLUSACDEM@aol

CIRCLE 538 ON READER SERVICE CARD

Practica Musica VERSION 3 Your personal music tutor now includes rhythm tapping, chord progressions, and many other exciting new features. More than ever the most complete music raining package available for ooth beginners and advanced students, \$140 611150 ARS NOVA • (206) 828-2711 • (800) 445-4866 FAX (206) 889-0359 or (206) 828-2132 ongworks Not only prints your song, but helps you write it! Suggests tune and harmony ideas, plays, prints melody, chord symbols, lyics-

CIRCLE 595 ON READER SERVICE CARD

with or withour

MIDI. \$125

MUSIC FOR THE MAC

The full scale of Products



7-9943

We also Carry Adobe & Microsoft products

We offer great pricing on computer-based recording systems, keyboards, sound modules, recording equipment, and all MIDI software, interfaces and

Authorized dealer for Digidesign, Opcode, Coda, Mark of the Unicorn, E-mu, Kurzweil, Passport, Panasonic, Ramsa, Roland, Tascam, Steinberg and

INFO-LINE: 505-473-3434

SALES 1-800-MAC-BEAT

fax: 505-473-4647

CIRCLE 572 ON READER SERVICE CARD



Family Roots™ Genealogy. Do it YOUR way! Huge variety and capacity for your family history. Make pedigree charts, descendants charts, person sheets, group sheets, indexes and much more. Customize to your own preferences. Standard Mac interface. Call for FREE information. Satisfaction guaranteed. MC/Visa/AE. Quinsept Box 216 Lexington MA 02173 617/641-2930 800/637-ROOT

## **DUPLICATION FROM \$.49**

From \$.49 (5.25") and \$.80 (3.50")

- All Diskette Formats
   Custom Labels
   Diskette Mallers / Ad
- Assembly Services
   Generous Volume Discounts

THE CAMPINE		
QTY	SONY	OEM
250	VERBATIM	GENERIC
3.50" DD	\$.47	\$.45
3.50" HD	\$.57	\$.53
N. O. A. Carlos Co., Co., Co., Co., Co., Co., Co., Co.,		

- 10% Discount on First Ord
- 10% Discount on First Green
   108, Macintosh, or Custom Formats
   Colored Media add S.05
   Private labeling / Volume Discounts

#### 800-255-3142

CIRCLE 496 ON READER SERVICE CARD

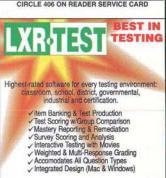


Save time and energy with MacGrade, the powerful grade manager that's fast, fun and exceptionally easy to use. Great reports and graphs. New! Version 2.2 has separate elementary and secondary/college editions.

#### Call (800) 795-0641

CalEd Software P.O. Box 22913, Carmel, CA 93922 60 Day Unconditional Money Back Guarantee.

CIRCLE 406 ON READER SERVICE CARD



Logic

909-980-0046 Fax: 987-8706 7168 Archibald Ave. Suite 240 Resources Rancho Cucamonga, CA 91701

CIRCLE 407 ON READER SERVICE CARD

Mac BEAT

1314 Rufina Circle A4 Santa Fe, NM 87501

Freehand 5.0

Infini-D 2.6

# **STUDENT - TEACHER - SCHOOL DISCOUNTS!**

QUARKXPRESS 31 \$299

AUTOCAD 12

ARCHICADD 4.5

DIRECTOR 4.04

FREEHAND 5.0

OMNIPAGE PRO

STRATA STUDIO PRO 1.5 \$495 LATEST VERSIONS & FULL PACKAGES

In Education:

The second section is a second			
4TH DIMENSION 3.2	\$475	MATHEMATICA 2.2	\$175
A.I.R. FRESCO	\$95	MINICAD +5	\$319
ASTOUND 1.5	\$129	M.Y.O.B. 5.0 WITH PAYROLI	\$90
AUTHORWARE PRO 2.2	\$975	M.Y.O.B. 5.0 W/OUT PAY	\$49
BLUEPRINT 5	\$149	NISUS WRITER 4.0	\$149
CAMERAMAN	\$79	NOW BUNDLE 3.0	\$75
CANVAS 3.5.2	\$175	NISUS WRITER 4.0 NOW BUNDLE 3.0 NOW UTILITIES 5.0	\$59
CLARIS DRAW 1.0	\$129	ONE-TWENTY-EIGHT 1.1	\$135
CLARIS WORKS 3.0	\$89	ORGANIZER 2.0	\$65
CODA FINALE 3.2	\$249	PAINT ALCHEMY	\$49
CODE WARRIOR GOLD	\$149	QUICKEYS 3.0.1	\$85
COLLAGE 2.0	\$175	ORGANIZER 2.0 PAINT ALCHEMY QUICKEYS 3.0.1 RAM DOUBLER 1.5	\$55
DATADESK 4.2	\$325	<b>RAY DREAM DESIGNER 3.0</b>	\$179
DELTAGRAPH PRO 3.5	\$95	SKETCH 2.0	\$249
DESIGN WORKSHOP	\$249	SKETCH 2.0 SMALLTALK 5 2.0	\$99
ENCORE 3.0.7	\$249	SOFT PC 3.0	\$89
FONTOGRAPHER 4.1	\$175	SOFT PC 3.0 SOFTWINDOWS 1.0	\$229
FORM : Z 2.62	\$975	SOUND EDIT 16	\$199
FRACTAL DABBLER	\$55	SPANISH POWER TRANSL.	\$349
FRACTAL PAINTER 3.0	\$219	STRATA TYPE 3-D 2.0	\$99
FRAMEMAKER 4.04	\$399	STRATA VIRTUAL 3-D	\$149
FULL CONTACT	\$79	STRATA VISION 3-D 4.0	\$249
IDEA FISHER	\$79	SUPERCARD 2.0	\$149
IN-CONTROL	\$69	SUPERCARD 2.0 BUNDLE	\$249
IN-CONTROL/QUICKEN	5 \$85	TEXTURESCAPE 1.5	\$85
		THEORIST 2.0 TYPESTRY 2.1.1 UP-FRONT 3-D 2.0	\$125
INFINI-D 2.6 INSPIRATION 4.1	\$89	TYPESTRY 2.1.1	\$135
JMP VERSION 3	\$329	UP-FRONT 3-D 2.0	\$125
KAI'S POWER TOOLS 2.	1 \$85		\$99
KPT BRYCE 1.0	\$85	VIDEO FUSION 1.6	\$275
LOGOMOTION 1.5	\$75	VIREX 5.5 VISTA PRO	\$60
MAC ACADEMY VIDEOS	\$39	VISTA PRO	\$79
MAC LINK PLUS TRANS		WACUWI ART PAD 4X5	\$139
MACROMODEL 1.5.2	\$429	ART PAD 4X5 W/ DABBLEF	
MAC WRITE PRO 1.5	\$85	WACOM ARTZ 6X8	\$285
MATHCAD 3.1	\$89	WORD PERFECT 3.1	CALL

\*\*SAME DAY SHIPPING ON MOST ITEMS.

\*\*ADOBE, SYMANTEC & MICROSOFT PRODUCTS AVAILABLE TO QUALIFIED STUDENTS, TEACHERS & SCHOOLS.

\*\*THOUSANDS OF OTHER TITLES AVAILABLE.

\*\*SCHOOL PURCHASE ORDERS WELCOME.

\*\*NO SURCHARGE ON CREDIT CARDS.

\*\*IBM & MAC PRODUCTS AVAILABLE.

WE WILL BEAT ANY ADVERTISED PRICE!!

7he SOFTWARE Source

1-800-289-3275









2517 Hwy 35, Bldg L Manasquan, NJ 08736 (908) 528-0030 FAX (908) 528-9378 MAIL: SFTSWS@AOL.CON

CIRCLE 570 ON READER SERVICE CARD

# EDUCATIONAL & RECREATIONAL MULTIMEDIA & CD ROM GRAPHICS



Bible Book Store On Disk

Full Featured, Fast and Friendly Bible Study software. As the leader in Bible Study software since 1981 we have continued to listen to our customers and provide them with the tools they need. We offer the most comprehensive line of Bible study tools available.

Call for FREE catalog. Bible Research Systems 2013 Wells Branch Pkwy #304 Austin, TX 78728 800/423-1228 512/251-7541

# $\operatorname{Bible}$ Master $_{\scriptscriptstyle{\mathsf{MASTER}}}$ Master bible

Get them all together...

King International James Version Version

New American Standard Bible

...add on modules

NAS Hebrew/Greek Dictionaries NAS Topical Studies and more!

# American Bible Sales 870 S. Anaheim Blvd., Anaheim, CA 92805 DISCOUNT SOFTWARE PRICES 1-800-535-5131 CIRCLE 537 ON READER SERVICE CARD

SOFTWARE FOR THE CHURCH

Management Programs: Written in 4th Dimension Roll Call for churches-Macworld\*\*\* review Aug. '93, Honor Roll for non-profit ministries. Full function demos with guide \$10. Online Bible — "The standard by which all other ... are judged" (Kay Hall, CMUG-LA May '94). Basic pkg: KJV/NIV, Strong's, X-refs, Lexicons. Many a-la-carte items available. Written in C, Fast, easy. 10 mgs. \$75

BY THE NUMBERS, INC. RR 1 Box 75, Sutton HN 03221 800-554-9116 ~ 603-927-4508

#### REUNION

the family tree software

New Version! Reunion quickly organizes your family information, displays pictures, shows



creates large graphic tree charts, calendars, family group sheets, mailing lists, cascading pedigree charts book-style family histories, and more. To order call 800-334-4444. For a free brochure, contact:

Leister Productions

U.S. Digital Topography

· Color shaded relief maps

State detail at 1:530.000

Editable in applications

Eastern U.S. \$99

Western U.S. \$99

which read PICT graphics

· Individual state maps

P.O. Box 289, Mechanicsburg, PA 17055 Phone 717-697-1378 — Fax 717-697-4373 CompuServe 74774,1626 — AOL LeisterPro

#### Family Heritage File™

Genealogy. New Version 3.3! Most powerful and easy genealogy program on Mac. Rated "BEST" by Macworld. Designed by genealogy professionals. • Stand alone

· Graphic Pedigree, Descendants, Family Group, Individual, Marriage, Surname

· Unlimited History · Sorted Lists · Export to WP/data base/ modem • GEDCOM compatible • Jewish/LDS features. \$149 + 5 s/h. Ask about Family Heritage Bundle. Visa/MC. Demo \$7. Free Lit Pak.

StareCom Microsystems Windsor Park East 25 West 1480 N., Orem, UT 84057 801/225-1480





THE ULTIMATE TRAINING AID - Over 6 hours of screen movies, led by an experienced instructor.

On each CD you will find these features: MASTERCLASSES - approximately 200 movies taking you through the application step by step

REFERENCE - Look up menus and dialogs exercises/rips - Helping you learn by practice

JARGON - Learn technical jargon

AVAILABLE TITLES INCLUDE:

Quark Xpress 3.3, Illustrator 5.5, Pagemaker 5, Photoshop 3, and Mac Troubleshooting New titles under development - call for details

DEALER ENQUIRIES WELCOME - FOR ORDERS CALL (408) 492 1051

CIRCLE 436 ON READER SERVICE CARD

#### MacroMedia Director 4.03

Includes: Free CD-ROM

& Training Video

Apple Authorized

Fa=(800)689-9899

Fax Your Orders To: (212)967-7567

Visa 307-537-5261 M/C CIRCLE 419 ON READER SERVICE CARD

NEW PHOTO CD

Chalk Butte Digital Maps

CIRCLE 426 ON READER SERVICE CARD

## OSTERS MURALS BILLBOARDS BACKDROPS TRADESHOW EXHIBITS BANNERS THE ONLY FAST, EASY, ECONOMICAL WAY TO CREATE

LARGE-FORMAT PRINT JOBS.

Layouts up to 10,000 square feet
 Imports EPS, TIFF, Scitex CT artwork
 Drives any PostScript printer

Fixed, custom and automatic tile sizes

 Variable panels, margins, gaps, overlaps, bleeds
 Hundreds of professional large-format production tools Supported by a network of service bureaus nationwide

For info call: (617) 338-2222 or fax: (617) 338-2223

Now at MacWarehouse! 1-800-255-6227

100 PHOTOGRAPHED

242

©1994 S. H. Pierce & Co. Ste. 323 Bldg. 600, One-Kendall Sq., Cambridge, MA 02139



OVED RECKDEODS TENDESHOW EXHIBITS BENNE

#### Free CDROM Catalog

Mac Internet CDROMs InfoMac, Hyperstacks, -MacGames, MacSource Paper backgrounds CDROMs Color Illustrations CDROM Photograph CDROMs Jupiter Impact CDROM

\$39.95 each + \$5/US \$9/Int s&h

Pacific HiTech, Inc. Tel: 801-261-1024 Fax: 801-261-0310 800-765-8369

ALSO CD-ROM

RECYCLED ART • WEDDING
REAL ESTATE ART • ASTROLOGY

REAL ESTATE ART "A STROUGHT FLAGS OF THE WORLD "MISCOTS CARS & LIGHT TRUCKS "ANUMALS LOGGES & TRADENARKS, 1 - 12 INT'L SYMBOLS & ICONS, 1 & 2 "WOMEN BUSINESS SYMBOLS "MEDICAL SYMBOLS SAFETY & PACKAGING "FRATERIAL SYMBOLS

Accents & Attention Getters • Transportation Also: Special Edition Vinyl Cutters Packages

800 255-0562 FAX:802878-1788 • INFO: 802-879-1184 novation Advertising & Design Mansfield Ave • Essex Jat., VT 05452 CIRCLE 566 ON READER SERVICE

eMail: orders@pht.com

CIRCLE 414 ON READER SERVICE CARD

ELECTRONIC CLIP ART FOR ADVERT

## YOU WANT IT The Digital Photography Specialist

#### ▲ Repro and Pro Scans (35mm to 4x5)

- Encryption and Watermarks (your customized watermarks)
- ▲ Scan to magnetic media
- ▲ Import TIFF images

800 735-1950

**Palmer**Photographic 2313 C St. Sacramento, CA 95816

CIRCLE 431 ON READER SERVICE CARD



Professional Medical Clip Art



Super Anatomy 1, 2, 3 low Shipping • 400 New Images

• 100% Compatible in all Mac Software

Editable in Illustrator and MacDraw Pro!

TechPool Studio Cleveland, Ohio Tel: 216-291-1922 Fax: 216-382-1915 \*\*\*

CIRCLE 415 ON READER SERVICE CARE

#### The World of Comics As You've Never Seen it Before

The ComicBase Encyclopedia of Comics is a fantastic, interactive comic book encyclopedia on CD-ROM. It









## GRAPHICS



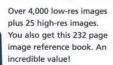
# Award-Winning Photos on CD-ROM!\* PHOTODISC



Perfect for ads. newsletters, brochures, stationery and more!

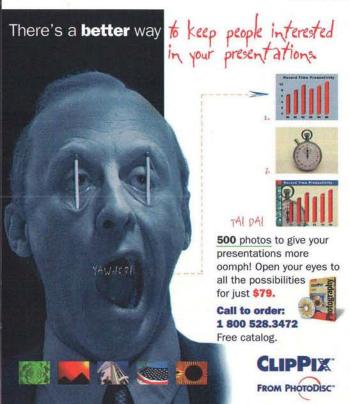
- ·High resolution, ready for color or B&W printing or laser output.
- ·Royalty free for marketing, advertising, multimedia and more.
- Artistic and technical quality makes PhotoDisc the 10 to 1 favorite.

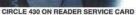
## Preview PhotoDisc for Only \$29!

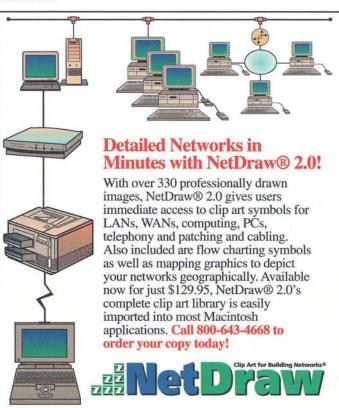




CIRCLE 429 ON READER SERVICE CARD







# GRAPHICS PROGRAMMING & UTILITIES SERVICES & SUPPLIES





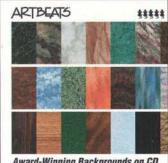
Use Slapsticks to create your own laser bumper stickers. You supply the message, we supply the blank stickers.

Slapsticks are high gloss, removable stickers for laser printers and are \$19.95

available in two sizes. Free software for designing and printing Slapsticks is included.

**ORDER NOW! 800-310-0890** (509) 624-5170 • Fax (509) 623-4276 Williams & Macias, Inc.

CIRCLE 435 ON READER SERVICE CARD



Award-Winning Backgrounds on CD

800-444-9392 or 503-863-4429 Artbeats, Box 709, M.C. OR 97457, Fax: 503-863-4547



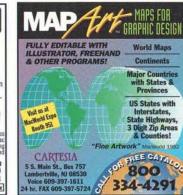
More than 1,000 logo designs — **ready to use** in EPS format. Eight different graphic categories, Available on Floppy or CM-ROM. **\$69**. (Call for free brochure.)



Logo SuperPower® lets you create world class designs like these in minutes. Available for Ma or PC on Floppy or CD-ROM. Requires drawing Design program such as Illustrator, FreeHand or Corel Draw. LSP Basic — 5119
Software (Call for free brochure)

Decathlon Corporation (800) 648-5646 or (513) 421-1938 4100 Executive Park Dr. #16, Cincinnati, OH 45241 Visa/MC/AmEx

CIRCLE 533 ON READER SERVICE CARD



#### Results! Are what our customers want...

And results are what they get via

- 50 Vector Input Formats 2D & 3D
- 40 Vector Output Formats 2D & 3D

Results that work for dozens of professions, throughout your office or manufacturing plant... work easier, work smarter with -

CADMOVER® - Graphic Translator

Call 703-532-0213 for more information.

CIRCLE 477 ON READER SERVICE CARD

#### -DIGITAL COLOR PRINTS-

#### BIG, BEAUTIFUL AND IMPRESSIVE.

Merge text, graphics and photos from your disk or original art. Produce posters, billboards, backlits, convention displays and P.O.P. displays from Mac or PC from 8-1/2" x 11" up to 52" x 30' in one piece.

T-SQUARE EXPRESS 998 W. Flagler St. Miami, FL 33130 1-800-432-3360 B.B.S. (305) 545-8180

#### FORTRAN 77 • System 7

LS FORTRAN is an ANSI/ISO standard FORTRAN 77 compiler for the Macintosh. Supports extensions from VAX and Cray FORTRAN, built-in debugging, background execution, software or hardware floating point, optimized code generation, and 2D or 3D graphics support. The complete solution to your FORTRAN programming needs. Language Systems Corp. P.O. Box 140 Sterling, VA 20164 703/478-0181 703/689-9593 Fax 800/252-6479

#### ATTENTION CROSS PLATFORM COMMUTERS

### SHIFT INTO THE FAST LANE WITH PIETO

513 513

The world's most popular data compression comes to Mac!



ASCENT SOLUTIONS Inc. (ASi) 10460 Msbg-Springboro Pike • Miamisburg, OH 45342 (513) 885-2032 FAX • (513) 885-2033 Data CIRCLE 418 ON READER SERVICE CARD

#### QUANTITY DISCOUNTS !

Iris Prints as low as \$10.50 (up to 10.6 x 17.2)

Linotronic Output

as low as \$ 3.75 (1270 dpi - 8.5 "x11") Oversized Lino and higher dpi is available

#### Displaymaker Ink Jet Prints

starting at \$35.00 for 16 x 20 Ink Jet Prints up to 3' x 16' Mac/Pc Files \* Canon Fiery Lasers \* Scans Mounting/Laminating Service 24 hr Modem - (212-869-6963) Fax (212-869-5727) - (VISA/MC/AMEX)

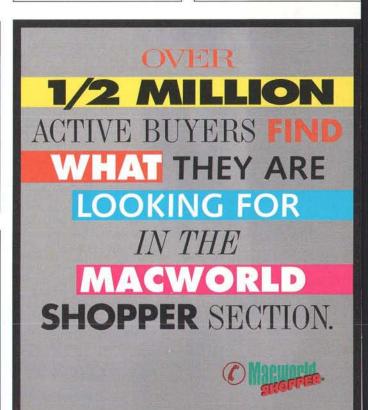
CALL US TODAY - 212-869-6960 MET PHOTO INC. 1500 Broadway, N.Y., N.Y. 10036

CIRCLE 465 ON READER SERVICE CARD

#### !!!Repairs by Mail!!!

Repairs from \$5.00!!! Same-day turnaround in most cases!! New and used hardware for sale! We buy dead Apples, Macs, PCs. Noon to 5:00, 6:30 to 10:00. Arminius

8519 Orchard Avenue Merchantville, NJ 08109 609-662-3420 (voice) 609-662-6460 (fax)





## **SERVICES & SUPPLIES**

les•Overheads 4x5's•Big Posters Canon's • Dvesubs



Professional PrePress Scans 35mm format-\$.90 Pro/4x5-\$8

Digital 4-Color Offset Printing Call For Details...

Satisfaction Always Guaranteed

7th St. • Atlanta, GA 30308 • 404-873-535

CIRCLE 456 ON READER SERVICE CARD

- 35mm Slide Imaging
- Custom Presentations
- Slide Duplication
- Digital Prints & Overheads



SuperiorGraphics

Call for Information: *(800) 925-1117* 

8111 LBJ Freeway, Suite 200 Dallas, Texas 75251 (214) 235-2226







CIRCLE 467 ON READER SERVICE CARD

#### "If it hadn't been for DriveSavers, our information would have been lost forever."



As the only all-Mac data recovery company, we've saved more mega-bytes of Mac data than anyone else in the world. We're certified by every Mac drive manufacturer.

Our proprietary techniques are so advanced we can rescue data others might simply abandon.

#### 1-800-440-1904

Restoring data-and peace of mind-since 1989

400 BEL MARIN KEYS BL. • NOVATO, CA 94949 • FAX: 415-883-0780 • PH: 415-883-4232 CIRCLE 510 ON READER SERVICE CARD

#### DATA RECOVERY IN HOURS.

- One-Day standard turnaround.
- Over 10 years of experience with clients like NASA, Apple, and FedEx.
- We've recovered more than half-amillion megabytes of Mac Data.
- Successful recovery is guaranteed.
- Call 24-hours a day.



CIRCLE 427 ON READER SERVICE CARD



\* REMOVABLE AND OPTICAL DRIVE \* CARTRIDGE \* POWERBOOK \* HARD DRIVES AND FLOPPY DISK

- Data Recovery Since 1989
   No Evaluation Charge 1-2 Day Turnaround Mechanica/Lectronic Failure, Virus or Data Corruption is Guarantee Recovery or It's Free Hard Drive Data Recovery Perform in Clean Room
  - 1-800-469-2549



## DATA RECOVER

- Expertise in Macintosh & virtually every operating system & storage device including tape & removable media
- 24-Hour Worldwide Support with on-site, weekend,
- Professional Service Authorized by major manufacturers



RECOVERY ®

MN: 1-800-872-2599 CA: 1-800-752-7557

London: +44 (0)81 974 5522 • Germany: 0130-815-198 • France: 05 90 72 42 ~ Ask about our referral programs ~

CIRCLE 459 ON READER SERVICE CARD

# Now 50 24 hr BBS 24/72 hr service Volume discounts 3–5 hr Immediate svc. High volume slide duplication nning and production services edia presentations and kiosks VISA 212/989 2727 800/445 9002

Data Recovery (800) 765-9292 We successfully Recover Data 98%

- From Drives With: Bad Motors · Electronic Failure • Mechanical
- Problems Damaged Heads
- · Missing or Bad Boot Sectors · Damaged or Missing Partitions
- FAT and Bit Map Errors
- Damaged Directory Structure
- Accidental Mishandling
- · Fire & Flood Damage At a Reasonable Cost!

CPR Recovery Services 11440 Okeechobee Rd. Suite 201 Royal Palm Beach, FL 33411

(407) 795-7266 BBS (407) 791-2189

From PC & Mac files \$3.75 \$20 4x5 chromes/negs Dye sub print/overhead \$18 Hi Res Scanning

Call for special pricing on Quantity Duplication of Slides & Overheads

Show & Tell 39 W38th St., NY, NY 10018 212 840 2912 • 212 840 7953 (fax)

CIRCLE 550 ON READER SERVICE CARD

#### INK-JET CARTRIDGE REFILL SERVICE 7.95

StyleWriter I & II, Cannon BC-01, 02, BJ-10E, 10X, BJ-20, 5, 200, 230, S, SE, HP DeskJet, DeskWriter & many more.

All refilled with smudge-proof quick drying, highest quality black ink for excellent print definition. 24-hr turnaround

Send empty cartridge & \$7.95 to: **ImageWorks** 7314 Western Ave., Darien, IL 60561 708-901-7754

# · All Rotating Media

- Best Success Rate
- Reasonable Rates
- · Highly Recommended

The Data Recovery Company"



2462 Waynoka Rd. • Colorado Springs, CC 719.380.1616 • FAX 719.380.702

CIRCLE 458 ON READER SERVICE CARD

### **MAC REPAIR**

- Apple™ Certified Technicians
- One-Day Service Turnaround\*
- Hard Disk Repair & Data Recovery Up to 75% below Dealer Rates
- Component-Level Repairs
- Expert Advice and Prices by Phone
- Power Supplies & Logic Boards

Lifetime Repair Warranty\*
Tel: 1-503-642-3456
'on many repairs. VisaMc/AX. Fast overnight
shipping available. We use genuine Apple™ parts.

1-800-MAC-SHOP

CIRCLE 515 ON READER SERVICE CARD

# Never again worry about computer theft or damage

What could be better than full replacement?

By now, you've probably heard or read about SAFEWARE® Insurance for microcomputers. But you may still wonder just what it protects, or whether it's really worth the investment. If you've never lost any part of your computer system or software, you probably don't yet realize the limitations of most standard insurance coverages.

What do you mean it's not covered?

Operating your computer system without SAFEWARE protection is fine as long as you don't have to worry about an accident or loss. But what if you came to your office one morning to find you'd been robbed? Or your home had been ransacked? Or that a pipe had burst and caused water damage? Or that your system had fallen victim to a leading destroyer of computers-a power surge? All events beyond your control. If something like this should happen to you, you're likely to find out the hard way how limited your standard insurance policy's protection really is. No matter how little or how much you have invested in your computer system, discovering that it's not covered can be an expensive lesson.

What's the right coverage?

SAFEWARE's COMPUTEROWNERS™ Policy is a simple, easy-to-understand coverage you can count on. The policy offers full repair or replacement of hardware, media and purchased software, after a low \$50 deductible.

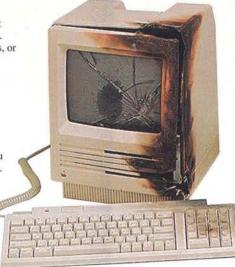
With your COMPUTEROWNERS Policy there's no need for you to schedule equipment or software as you do with "rider" policies. This will be especially important to you if you're ever planning to buy additional equipment or software, even just one peripheral.

#### No risk offer!

Your COMPUTEROWNERS Policy is a comprehensive plan of insurance, which means that it covers hardware, purchased software and media. Your complete system is protected against theft, fire and accidental damage. Your SAFEWARE Policy even covers damage caused by power surges . . . the leading destroyer of microcomputers.

The COMPUTEROWNERS Policy does not cover theft from an unattended vehicle, earthquake or computers outside of the U.S. and Canada. Call for these coverages.

Now, the COMPUTEROWNERS Policy is available on a no risk basis. If you are not completely satisfied with your coverage, you may return the policy for a full refund within 10 days of receiving it.



**Press Reports** 

COMPUSERVE MAGAZINE . . . "If you use your computer for business, chances are your homeowners' policy won't cover it. Instead, you need to purchase special insurance. If you're self-employed, the premiums are tax-

THE WASHINGTON POST . . . "According to industry analysts, thefts of personal computers have risen by 400 percent since 1991.'

Tens of thousands have said "ves!"

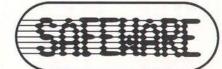
Since it was first introduced in 1982, tens of thousands of computer owners have said "yes" to SAFEWARE. Owners of systems, from the smallest portable to larger sophisticated business systems, are finding that SAFEWARE offers the most affordable and complete protection. SAFEWARE coverage offers the simplest peace of mind available to ensure carefree computing.

#### Easy to order!

Choose from two simple ways to pay for your COMPUTEROWNERS Policy: Call the tollfree phone number listed and we'll charge the premium to your VISA, MasterCard or American Express. You can also mail the coupon along with your check or credit card payment.

Total Hardware, Media & Software System Value	Annual Premium
Up to \$2,000	\$49
2,001 - 5,000	69
5,001 - 8,000	89
8,001 - 11,000	109
11,001 - 14,000	129
Call toll-free for rates on hig	her coverage

It is an underwriting requirement that you insure all your computer equipment for full replacement cost.



SAFEWARE, The Insurance Agency Inc. 2929 N. High St. P.O. Box 02211 Columbus, Ohio 43202

#### 1-800-SAFEWARE

NOW AVAILABLE IN CANADA!

With your COMPUTEROWNERS policy you get...

- Full repair or replacement coverage.
- Freedom from worries of fire, theft or accidental damage.
- Ultimate in power surge protection.
- Costs as low as \$49 per year.

#### ACTIVATE A SAFEWARE COMPUTEROWNERS POLICY NOW!

Complete, sign and return with your credit card or check payment. Or, for faster service, call

1-800-800-1492

On CompuServe: GO SAF

#### YES! MY COMPUTER **NEEDS IMMEDIATE** COVERAGE.

I understand I have 10 days from receipt of my policy to review terms and conditions. If not satisfied, I can return for a full refund.

Please Print Clearly	
Name	
Address	
City	
State/Zip	
Total System Value \$	
Enclosed is my payment for one year	

Check enclosed

	MC	VISA	American	Expres
~				

Card# Expiration Date

Daytime phone

Signature

This ad is a general summary of the provisions and qualifications of the insurance benefits included in the policy. Review your policy for full details. Call for coverage in TX, MI and NY. Void where exhibited. prohibited.

SAFEWARE, The Insurance Agency Inc. 2929 North High St. P.O. Box 02211 Columbus, Ohio 43202

AMERICAN BANKERS INSURANCE COMPANY 11222 Quail Roost Drive, Miami, FL 33157

246

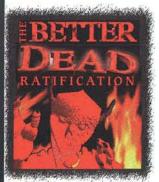
CIRCLE 522 ON READER SERVICE CARD

"The Granddaddy of all CD-ROM catalogs is EDUCORP."

Foreign customers send \$4 p/h for the catalog. With any purchase, you'll get EDUCORP's informative newsletter, free!

Prices subject to change without notice. Dealer inquiries welcome.

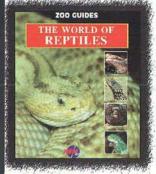
Free express 2-day shipping on products marked with an '+'.



**Better Dead** #1467 Sci-fi thriller \$49<sup>95</sup>



Star Trek Tech. Manual #50612



ZooGuides v.5: The World of Reptiles #50816 \$39<sup>95</sup>

# **Over 1,100 CD-ROM Titles in Stock**

	Оаше
50858	Blade
50640	Arc of Doom
50573	Sea & Sky
50439	Spectre VR
50532	Theme Park
P1583	Spaceship Warlock Non-AV , 19.95
50198	Dragon's Lair
50107	Myst
50588	Skull Cracker
50599	Simtown (for kids)
50821	Lemmings/Oh No More 37.95
	1

#### Entertainment

	chiertaniment
0661	4 Paws of Crab\$29.95
0389	Cookbook U.S.A 27.95
0699	People Magazine 20 Yrs of Pop 22.95
0695	Dazzeloids
0319	Freak Show
0403	Maus
2095	A Hard Day's Night 27.95
0696	For All Mankind 27.95
457	From Alice to Ocean 49.95
0820	Blaml
0757	Headcandy
0756	Residents Gingerbread Man 33.95
0656	Bubblegum Crisis Screen Saver 22.95
0548	Money in the '90's 29.95
0294	Xpora 1: Peter Gabriel's World 47.95
0657	Project A-KO Screen Saver 22.95
300	EDUCORP Shareware 9.0 + 99.95
0642	Cosmology of Kyoto 67.95
60803	Sports Illustrated Almanac 39.95
0340	Marilyn & André + 54.95

### Education

	TAMOUNTALL
50801	Cartoon History of Universe \$33.95
50639	Small Blue Planet Cities Below 32.95
2090	Small Blue Planet Real Picture 37.95
50299	Learn to Speak Spanish 4.0 99.95
1642	Family Doctor
50421	Learn to Speak French 4.0 99.95
50278	Learn to Speak Japanese 3.0 63.95
1460	Mayo Clinic Family Health Bk 37.95
50113	Mayo Clinic The Total Heart 19.95
50624	A.D.A.M. The Inside Story 49.95
50870	Math Rabbit Deluxe 44.95
50867	Reader Rabbit 1 Deluxe 44.95
50880	Reader Rabbit 2 Deluxe 44.95
50881	Circus
50014	Oregon Trail
50836	Amazon Trail 42.95
50835	Yukon Trail42.95
2078	Animal Alphabet

## Reference

201.13	visiapiu
50122	Redshift MM Astronomy 49.99
50841	3D Atlas67.95
50317	Street Atlas USA
50110	Encyclopedia of Dinosaurs 4 39.95
1280	Encyclopedia of Life + 54.95
2081	ZooGuides v.1: Butterflies/World39.95
1210	ZooGuides v.2: Whales/Dolphins 39.95
1275	ZooGuides v.3: Mammals/Africa 39.95
50300	ZooGuides v.4: Rainforest 39.95
50817	ZooGuides v.6: Life in Desert 39.95
50556	Masterworks/Japanese Paint 52.95
50037	
50852	
50309	Cinemania '95
1333	Groliers MM Encyclopedia 83.95
	FREE The Animals: San Diego Zoo.
50246	PhoneDisc PowerFinder 139.95
50196	Select Phone
50671	Old Testament
50789	American Heritage Dictionary 37.95
50847	Amazing Animation
50617	Macmillan Dictionary Children 19.95
50863	The Way Things Work 48.95
De	alstan Dubliahina

## Desktop Publishing

50447	EDUCORP Photo Sampler 2.0 + \$9.95
50329	EDUCORP Clip Art Sampler + 9.95
50204	Professional Backgrounds ** 64.95
50442	Earth & Space Photos +* 19.95
50590	Royalty-Free Food ** 54.95
MB1	Medical Library Bundle +* 99.95
	2-CD set. 200 royalty-free stock photos.
1680	Graphtec Graphic Designs 4 39.95
P1330	Clip Art 3.0 +
50073	Design Toolkit Pro ← 79.95
50885	Missy Hamilton's Textures + 49.95
Co	Lat A a large pa \$770

### Sale! As low as \$395

	IC. ILD ICH UD C
P1948	Sports Illustrated 1991 Almanac \$5.95
L1774	I Photograph to Remember 9.95
L1777	Mozart: Dissonant Quartet 16.95
L1875	600 Days to Cocos Island7.95
F900	Apple QuickTime CD 3.95

**CD-ROM Drives** 

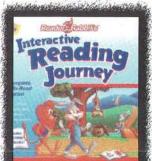


Porta-Drive T3501 (Quad Speed) . . . \$399 Free Lunicus, Mister X and CD Sampler. Access Time: 150 ms, Data Transfer: 630 Kb/sec More drives & bundles available, call.

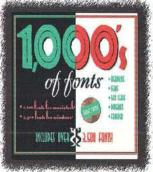
\*Titles are in KODAK Photo CD Format.



Midnight Stranger \$5995 + #50316 Adults Only.



Interactive Reading \$8495 **Journey #50869** 



1,000's of Fonts + \$1995



The Multimedia Pioneer

W35

\*\*some restrictions apply



7434 Trade Street 📕 San Diego, CA 92121 📕 Info: 619-536-9999 🖩 FAX: 619-536-2345 📕 Internet: service@educorp.com Circle 157 on reader service card



# The Library at Redmond

Guy spends Bill's billions

EAR BILL: LIKE ALEXANDER the Great, you've conquered almost every market you've entered, starting with the computer business: Apple, IBM, Next, and the herd of clone makers have all fallen under your wheels. You're entering the online-services business as well as multimedia, and I'm sure you'll mow down the competition in these industries too. You're going to need a new challenge soon, and I am concerned about your career path, so I have a suggestion for your next job.

I think you should be a librarian.

The job will not pay well (in fact, it will cost you a couple of billion), but after Microsoft and your business conquests are as long forgotten as John Sculley's technical expertise, your librarian role will be remembered. Actually, *remembered* is too modest a word—you will be cherished as one of the great men of all time, right up there with Michelangelo, Leonardo da Vinci, and Barry Diller. You will cross the chasm from rich, successful businessman to "goodness."

This is my idea. You should create a foundation for the preservation of books, manuscripts, and journals. (I would not relegate you to just any librarian position.) The reason is that books and manuscripts are falling apart, rotting, and turning to dust in libraries and museums all over the world. Every day society is losing its past as institutions are forced to save only what's crumbling fastest or what's most valuable.

When these books and manuscripts are gone, there will be no replacing them; and even the ones being preserved in their analog form are not available to most people. For example, if you want to read the original copy of *Adagia*, a collection of proverbs by Desiderius Erasmus published in 1508, it's not likely to be in the Seattle public library.

Think of what creating this foundation means: you would be known for eternity as the keeper of the knowledge of the human race. This is a lot better than the wealthiest man in America according to Forbes for the next few decades. No one knows who Theodosius was (the emperor who ordered the burning of the library of Alexandria, according to your product Microsoft Bookshelf 1994), but people will know you. You've already made a start with your purchase of the electronic rights to artwork and da Vinci's manuscript, so why not go for it all?

I got this idea from an editor at Macmillan Publishing a few months ago. Then someone on the Internet, a marketing professor at the University of Missouri (who uses a Windows machine, no less), turned me on to the writing of Stephen Jay Gould. Gould is the eminent professor of biology, geology, and the history of science at Harvard University and a columnist for *Natural History* magazine.

R CONTRACTOR OF THE SECOND SEC

Gould's writing reinforced for me the desirability of the idea.

His work is an elaborate tapestry of facts from the insights of an amazing number of people, ranging from Charles Darwin to Ty Cobb. He cites sources that mere mortals have never heard of, much less have access to. Try reading Gould's *Bully for Brontosaurus* (W. W. Norton & Company, 1991) if you don't believe me. It helps, however, that he is a famous professor at Harvard, so he can get to the crumbling books, manuscripts, and periodicals that the rest of us can't.

Gould himself expresses why this idea is so important as he discusses the pain that the loss of the library of Alexandria has caused:

"In part, we lament the loss of the utterly unknown. But we miss just as much the opportunity to relish a greatly expanded diversity among people and ideas that we already know and love. We miss the joy of making concrete, the pleasure of holding what has disappeared forever. What is history all about if not the exquisite delight of knowing the details, and not only the abstract patterns."

How much would it cost to preserve all of our printed treasure? I think \$1 billion—\$2 billion at the outside. Your net worth is at critical mass, so being worth \$8 billion is the same as being worth

\$10 billion. You'll make Walter Annenberg look like the cheapskate who tosses a nickel into the Salvation Army kettle.

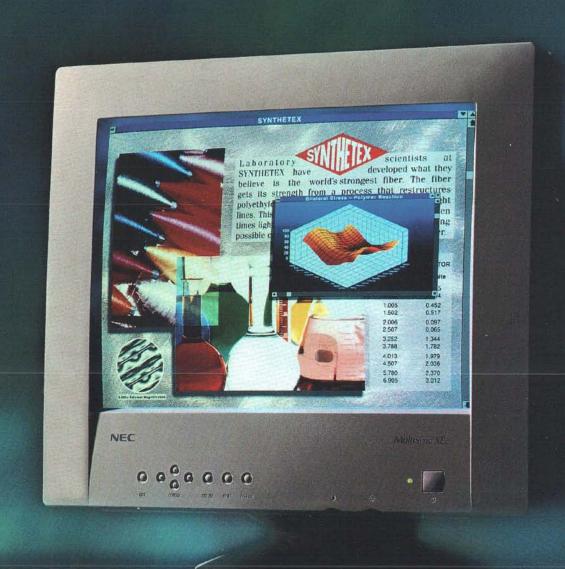
You may feel like you need to get something out of this foundation beyond knowing that you're preserving the history of man. OK. Many of these libraries and museums would grant you the electronic publishing rights for these priceless works. For them, this kills two birds with one stone: preserving the books, while increasing accessibility to knowledge for the common person. Then, post the electronic files on the Microsoft

Network—you'll instantly create a compelling reason to use your service.

One more point: Please don't use the Word 6 format for these files. The information should be preserved for eternity, not take an eternity to see.

Sincerely, Guy Kawasaki

GUY KAWASAKI's views are his own and only sporadically represent those of *Macworld*. He has investments in Bit Jugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at macway@aol.com.



# ERIES. AT FINE LINE LAY.

while automatically optimizing performance.\* Our MonitorManager™ software (another first from NEC) allows you to switch resolutions (for Macintosh®),

MultiSyne XE Series

Flat square CRT, Plug and Play, Digital On-Serven Controls, AccuColor® Energy Star, MPR-II, NUTEK, Compatible with PC and Mae Systems

XE15 15" CRT, 13.8" viewable image size Max Res: 1024 x 768 NI @ 76 HZ

XE17 17" CRT. 15.6" viewable image size Max Res: 1024 x 768 NI @ 76 HZ

XE21 21" CRT, 19.8" viewable image size Max Res: 1280 x 1024 NI @ 60 HZ use power management features, and control all key aspects of color.

Every NEC monitor is backed by a threeyear limited warranty.

More importantly, each

is backed by our reputation for building the finest computer monitors in the world.

For more information on the MultiSyne XE Series call us at 1-800-NEC-INFO. Or if you'd prefer information sent to your fax, call NEC

FastFacts™ at 1-800-366-0476.

When prompted, you should simply request our document SEE, HEAR AND FEEL THE DIFFERENCE!"

number 9301.

NEC

Circle 16 on reader service card

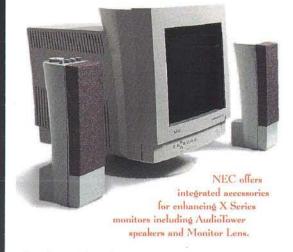
Other trademarks are property of their respective owners. ©1994 NEC Technologies. Inc.

# THE NEW MULTISYNC® XE S THE ONLY THING IT BLURS IS TH BETWEEN WORK AND P

hree years ago, we set out on a mission.

To build the finest computer monitors in the world. Which is a rather ambitious quest. After all, many experts already considered the NEC MultiSyne monitor, first developed just a decade ago, the most precise, most brilliant monitor ever.

Now, for a company that prides itself in



technological achievement, our mission was rather un-technical: To build a line of computer monitors that were so realistic, so crystal-clear, so easy to control, that people would actually look forward to working with them.

NEC is proud to introduce the newest members of the MultiSyne family: The XE Series.

To make everything perfectly clear, the XE Series features our unique OptiClear™ surface that virtually climinates glare, an Invar shadow mask that assures maximum brightness without loss of focus, and a super fine .28 mm dot pitch. They also feature flicker-free refresh rates of up to 120Hz.

Then, we packed them with a number of features that make them far easier to work with. Our On-Screen Manager (OSM™) offers on-screen controls with animated icons that visually demonstrate your options. OSM allows you to control all monitor functions, from screen geometry and screen size to color temperature. (A veritable field day for those of you who happen to be Type A personalities.)

We're also the first to offer compatibility with the new Microsoft® Plug and Play standard, which virtually climinates configuration headaches

# Anatomy of a Smarter Mouse.



It has four programmable buttons. More than a dozen time-saving functions. You can even create a personalized pop-up menu for each of your favorite programs. And the hardware is as smart as the software—with rubberized EasyGrip™ sides for more comfort and control. From the makers

of Turbo Mouse, winner of more awards than any Macintosh input device in history. Compatible with System 6.0.7 or later and Power Macintosh. For more information, call Kensington at 800-535-4242. Outside the US and Canada, 415-572-2700. For information by fax, call and request document 323.





